World's Columbian Exposition, Chicago, 1893.

CATALOGUE

OF

NEW SOUTH WALES EXHIBITS.

DEPARTMENT E.

MINES, MINING, AND METALLURGY.

Sydney:
CHARLES POTTER, GOVERNMENT PRINTER, PHILLIP-STREET.

1893.

12*h* 32—93 A

Digitized by the Internet Archive
in 2017 with funding from
This project is made possible by a grant from the Institute of Museum and Library Services as administered by the Pennsylvania Department of Education through the Office of Commonwealth Libraries

https://archive.org/details/catalogueofnewso00worl_2

Department E.

MINES, MINING, AND METALLURGY.

Committee VII, on Mining and Metallurgy.

EX-OFFICIO MEMBERS:

William McMillan, Esq., M.P. (*President*).

The Honourable Sir Joseph Abbott, Kt., M.P., Speaker of the Legislative Assembly (*Vice-President*).

The Right Worshipful William Patrick Manning, M.P., Mayor of Sydney (*Vice-President*).

John FitzGerald Burns, Esq., J.P. (*Vice-President.*)

The Honourable Arthur Renwick, M.D., F.R.C.S. Edin., M.L.C. (*Executive Commissioner*).

MEMBERS.

Charles Launcelot Garland, Esq. (Chairman).
The Honourable Alexander Brown, M.L.C.
Austin Chapman, Esq., M.P.
Mahlon Clarke Cowlishaw, Esq., J.P.
The Honourable John Davies, C.M.G., M.L.C.
William Springthorpe Dowel, Esq., M.P.
Jacob Garrard, Esq., M.P.
W. A. Hutchinson, Esq., J.P.
Frederick William Jackson, Esq., J.P.
Francis Edward Joseph, Esq.
Stewart Keightley, Esq., J.P.
Lloyd Alonzo Kimball, Esq.
Joseph Marks, Esq., J.P.
James Martin, Esq., M.P.
Henry William Newman, Esq., M.P.
Bruce Baird Nicoll, Esq., M.P.
Edward William O'Sullivan, Esq., M.P.
Thomas Saywell, Esq., J.P.
Sydney Smith, Esq., M.P.
James Torpy, Esq., M.P.
Francis A. Wright, Esq., M.P., and
John Young, Esq., J.P.

ALEX. CUMMING,
Secretary.

Department E.—Mines, Mining, and Metallurgy.

CLASSIFICATION.

CLASSIFICATION.

Group 42.—Minerals, Ores, Native Metals, Gems, and Crystals. Geological Specimens.

Class 290.—Collections of minerals systematically arranged.
Class 291.—Collections of ores and the associated minerals; diamonds and gems, rough, uncut and unmounted. Crystallography.
Specimens illustrating the formations of the earth, systematically arranged.

Group 43.—Mineral Combustibles—Coal, Coke, Petroleum Natural Gas, &c.

Class 292.—Coal—Anthracite, semi-bituminous, and bituminous; coal waste, "slack," coke, and pressed coal.
Class 293.—Asphaltite and asphaltic compounds—Uintaite, wurtzilite, grahamite, albertite, bitumen, mineral tar, amber.
Class 294.—Petroleum—Illuminating and lubricating oil.
Class 295.—Natural gas—Methods of conveying and using.

Group 44.—Building Stones, Marbles, Ornamental Stones, and Quarry Products.

Class 296.—Building stones, granites, slates, &c., rough hewn, sawed, or polished—For buildings, bridges, walls, or other constructions, or for interior decoration, or for furniture.
Marble, white, black, or coloured—Stalagmitic marbles, "onyx," brecciated marbles, silicified wood, agates, jaspers, porphyries, &c., used in building, decoration, statuary, monuments, vases, or furniture.

Group 45.—Grinding, Abrading, and Polishing Substances.

Class 297.—Grindstones, hones, whetstones, grinding and polishing materials, sand, quartz, garnet, crude topaz, diamond, corundum, emery in the rock and pulverised, and in assorted sizes and grades.

Group 46.—Graphite and its products; Clays and other fictile Materials and their direct Products; Asbestos, &c.

Class 298.—Crude graphite, in blocks and in powder.
Class 299.—Graphite and compounds for coating iron.
Class 300.—Graphite lubricants.
Class 301.—Electrotypers' graphite.
Class 302.—For pencils, crayons, &c..
Class 303.—Graphite crucibles, and melting pots.
Class 304.—Clays, kaolin, silex, and other materials for the manufacture of porcelain faience, and of glass, bricks, terra cotta, tiles, and fire-brick; various examples.

Department E.—Mines, Mining, and Metallurgy.

CLASSIFICATION.

Class 305.—Refractory stones for lining furnaces, sandstone, steatite, &c., and refractory furnace materials. Mica; kidney, sheet, or ground.
Class 306.—Bauxite clay for the manufacture of aluminum.
Class 307.—Asbestos, crude and manufactured.
Class 308.—Meerschaum.

Group 47.—Limestone, Cements, and Artificial Stone.

Class 309.—Lime, cement, and hydraulic cement, raw and burned, accompanied by specimens of the crude rock or material used; also artificial stone, concrete, beton.
Specimens of lime mortar and mixtures, with illustrations of the processes of mixing, &c. Hydraulic and other cements.
Class 310.—Beton mixtures and results, with illustrations of the processes.
Class 311.—Artificial stone for building purposes, building blocks, cornices, &c., artificial stone mixtures for pavements, walls, or ceilings.
Class 312.—Asphaltic mastics and mixtures, asphaltic sand, asphaltic limestone.
Class 313.—Gypsum, crude and boiled, calcareous; plasters, mastics, &c.

Group 48.—Salts, Sulphur, Fertilisers, Pigments, Mineral Waters, and Miscellaneous useful Minerals and Compounds.

Class 314.—Salt from beds or from brines.
Class 315.—Nitre and other nitrates.
Class 316.—Sulphates, alums, and other salts.
Class 317.—Sulphur and pyrites for the manufacture of sulphuric acid.
Class 318.—Boracic acid and its salts; borax.
Class 319.—Pigments, iron oxides, ochres, vermillion, &c.
Class 320.—Mineral fertilising substances, gypsum, phosphate of lime, marls, shells, coprolites, &c., not manufactured. (For commercial fertilizers and compounds, see Group 17.)
Class 321.—Mineral waters, artesian well water (for commercial forms, as bottled and as beverages, see Group 10); natural brines, saline and alkaline efflorescences and solutions.

Group 49.—Metallurgy of Iron and Steel with the Products.

Class 322.—Ore mixtures, fluxes, and fuels.
Class 323.—Blast furnaces—Stacks, stoves, blowing apparatus and arrangement.
Class 324.—Pig-iron, cast-iron, and mixtures.
Class 325.—Cupola furnaces.
Class 326.—Direct processes—Sponge and blooming plant and apparatus.
Class 327.—Puddling—Furnaces and appliances.
Class 328.—Bessemer machinery—Details and arrangements.
Class 329.—Basic process and apparatus.
Class 330.—Open-hearth steel—Plant and apparatus.
Class 331.—Crucible steel—Plant and apparatus.
Class 332.—Nickel steel.
Class 333.—Manganese iron and steel, chrome steel, aluminum steel, tungsten steel, other forms of steel.
Class 334.—Iron and steel—Bars, rods, sheets, wire.

Department E.—Mines, Mining, and Metallurgy.

CLASSIFICATION.

Group 50.—Aluminum and its Alloys.

Class 335.—Aluminum, pure and commercial; ingots, castings, bars, rods, wire sheets, and partly manufactured.
Class 336.—Aluminum alloys.
Class 337.—Aluminum alloy wire and wire-cloth.
Class 338.—Process for the extraction of aluminum; electric reduction and results.

Group 51.—Copper and its Alloys—Metallurgy.

Class 339.—Native copper, and the methods of extracting, melting, and refining it.
Class 340.—Copper ores and their treatment by fire. Copper smelting. Pneumatic process. Converter system.
Class 341.—Copper extraction in the "wet" way.
Class 342.—Copper in ingots, bars, and rolled, with specimens illustrating its various stages of production. Copper and zinc. Brass industry, and products regarded as materials of manufacture.
Class 343.—Copper and aluminum, aluminum bronze.

Group 52.—Metallurgy of Tin, Tin-plate, &c.

Class 344.—Tin ores and their treatment.
Class 345.—Block tin and its extraction from tin ore.
Class 346.—Tin-plate and methods of cleaning and coating iron and steel plates.

Group 53.—Metallurgy of Zinc, Nickel, and Cobalt.

Class 347.—Production of spelter.
Class 348.—Sheet and bar zinc.
Class 349.—Production of zinc oxide.
Class 350.—Nickel in ingots, bars, rods, sheets, and wire.
Class 351.—Nickel-covered steel and iron by rolling.
Class 352.—Nickel "plating."
Class 353.—Nickel salts.
Class 354.—Special nickel alloys, as German silver, &c.
Class 355.—Nickel steel. (See Class 332.)

Group 54.—Metallurgy of Antimony and other Metals not Specifically Classed.

Class 356.—Crude and star antimony.
Class 357.—Antimony compounds and principal alloys.
Class 358.—Arsenic, white arsenic, orpiment, and realgar.
Class 359.—Bismuth and alloys. Quicksilver and amalgams.

Group 55.—Extraction of Gold and Silver by Milling.

Class 360.—Gold mills and accessories.
Class 361.—Silver mills and accessories.
Class 362.—Apparatus and accessories of amalgamation; handling quicksilver.
Class 363.—Retorting, melting, stamping, shipping bullion.

Department E.—Mines, Mining, and Metallurgy.

CLASSIFICATION.

Group 56.—Extraction of Gold and Silver by Lixiviation.

Class 364.—Roasting and chloridising furnaces.
Class 365.—Chlorination process and adjuncts.
Class 366.—Other processes.

Group 57.—Extraction of Gold, Silver, and Lead by Fire.

Class 367.—Furnace plant and appliances.
Class 368.—Lead bullion moulds and bars.
Class 369.—Refining operations.

Group 58.—Quarrying and Working Stone.

Class 370.—Quarrying, channeling, and cutting engines.
Class 371.—Derricks and fittings.
Class 372.—Slate-cutting, sawing, and planing machines.
Class 373.—Machines and apparatus for cutting, turning, and polishing marble, granite, and other stone. (See Group 78.)

Group 59.—Placer, Hydraulic, and "Drift" Mining.

Class 374.—Apparatus and machines for washing gravel; sluices, cradles, toms, rockers, rifles, &c.
Class 375.—Construction of ditches, flumes, pen-stocks, &c.
Class 376.—Pipes for conveying water.
Class 377.—"Giants," nozzles, and appurtenances.

Group 60.—Tools and Appliances of Underground Mining, Timbering, and Supporting.

Class 378.—Timber cutting and framing machines.
Class 379.—Methods of timbering shown by examples.
Class 380.—Underground chutes, gates, and appliances for delivering ores. Methods and appliances for ventilating, lighting, and signaling.

Group 61.—Boring and Drilling Tools and Machinery, and Apparatus for Breaking out Ore and Coal.

Class 381.—Picks, gads, and hammers.
Class 382.—Hand-drills, hammers, and blasting implements.
Class 383.—Drilling by steam or compressed air—"power drills."
Class 384.—Diamond drills for prospecting or for sinking and driving.
Class 385.—Well and shaft boring (various systems).
Class 386.—Boring for water, oil, or gas—Tools and methods.
Class 387.—Machines, apparatus, and implements for cutting coal.

Group 62.—Pumps, Engines, and Apparatus used in Mining for Pumping, Draining and Hoisting.

Group 63.—Moving, Storing, and Delivering Ores, Coals, &c.

Class 388.—Tramways, turn-tables, automatic hoisting and conveying on the surface, contrivances for loading and unloading ores and coal.
Class 389.—Cars of all kinds.
Class 390.—Automatic dumping.
Class 391.—Ore bins and appliances.

Department E.—Mines, Mining, and Metallurgy.

CLASSIFICATION.

Group 64.—Apparatus for Crushing and Pulverising.

Class 392.—Rock breakers.
Class 393.—Rolls.
Class 394.—Large stamps.
Class 395.—Stamps and mortars.
Class 396.—Revolving grinding mills.
Class 397.—Coal breakers.

Group 65.—Sizing Appliances.

Class 398.—Grizzlys and bar screens and sieves.
Class 399.—Perforated plates.
Class 400.—Wire-mesh sieves and trammels.
Class 401.—Sizing by currents of water or air. Overflows.
Class 402.—Sizing by belts.

Group 66.—Assaying Apparatus and Fixtures.

Class 403.—Plans of assay offices.
Class 404.—Furnaces, muffles, and appliances.
Class 405.—Scorification and cupelling.
Class 406.—Volumetric methods and apparatus.
Class 407.—Fluxes and their receptacles.
Class 408.—Assay balances, &c. (See Group 112.)
Class 409.—Assay tables, assay schemes and methods.

Group 67.—History and Literature of Mining and Metallurgy.

Class 410.—Maps, relief-models, and pictures to illustrate the geology and distribution of minerals and mines and the methods of working mines.
Class 411.—History and statistics of mines and mining districts.
Charts, diagrams and tabular representations. Statistics of mineral production.
Class 412.—Mine engineering—Surface and underground surveying and plotting, projection of underground work, location of shafts, tunnels, &c.: surveys for aqueducts and for drainage,
Boring and drilling rocks, shafts, and tunnels, &c.; surveys for aqueducts, and for ascertaining the nature and extent of mineral deposits.
Construction—Sinking and lining shafts by various methods, driving and timbering tunnels, and the general operations of opening, stoping, and breaking down ore; timbering, lagging and masonry.
Hoisting and delivering at the surface, rock, ore, or miners; pumping and draining by engines, buckets, or by adits.
Ventilating and lighting.

Group 68.—Originals or Reproductions of Early and Notable Implements and Apparatus used in Mining and Metallurgy.

Mineral Products of New South Wales.

Specially prepared from the publications of the Department of Mines, New South Wales, for the World's Columbian Exposition, by Joseph E. Carne, F.G.S., *Geological Surveyor, Officer in charge of the N.S.W. Mineral Exhibits at the Exposition, and reprinted from special edition of the "Year Book of New South Wales," with permission of the proprietors of the Year Book of Australia.*

The important progress that the mining industry of New South Wales has made is apparent when we compare the value of the mineral production of the past ten years with that of the production of each of the four preceding decades.

Value of Minerals Raised.

During the 10 years ending	1841	£81,275
,, ,,	1851	634,937
,, ,,	1861	14,276,637
,, ,,	1871	16,638,574
,, ,,	1881	23,441,890
,, ,,	1891	38,459,650

The value of minerals raised during the year 1891 was £6,655,010, being an increase of £1,371,169 upon the value of minerals raised in 1890; and this notwithstanding the fact that many mines have been idle owing to want of proper methods of treatment, and the output of others greatly restricted by the drought.

Such returns as these clearly show the increasing and national importance of the mining interests of N.S.W.

Previous to the year 1851 coal was the only mineral raised, and even up to the year 1871 the only minerals which had been worked were coal, shale, gold, copper, and antimony; but during the ten years ending 31st December, 1881, tin, silver, iron, lead, asbestos, and bismuth were added to our mineral products.

The quantity and value of the various minerals produced to the end of the year 1891 are as follows:—*

Mineral.	Quantity.	Value.		
		£	s.	d.
Gold	10,373,452 ozs.	38,633,417	17	10
Coal	53,850,743 tons	25,809,040	10	11
Shale	653,041 ,,	1,416,716	7	6
Coke	61,407 ,,	75,620	9	5
Silver, Silver-lead and Ore—				
Ingots	4,941,138 ozs.			
Silver-lead	199,616 tons	11,302,095	0	0
Ore	219,716 ,,			
Tin—				
Ingots	100,400 ,,	9,526,796	0	0
Ore	17,723 ,,			
Copper—				
Ingots	93,926 ,,	6,023,431	0	0
Ore	5,317 ,,			
Iron	49,651 ,,	383,565	13	8
Iron (oxide)	1,173 ,,	2,647	0	0
Antimony	6,047 ,,	115,798	8	6
Bismuth	168 ,,	36,641	14	0
Lead (pig)	839 ,,	10,323	0	0
Zinc-spelter	526 ,,	5,988	0	0
Limestone flux	115,494 ,,	107,346	11	11
Alum	924 ,,	4,888	0	0
Manganese ore	238 ,,	665	0	0
Cobalt ore	1·15 ,,	470	0	0
Opals	195 lbs.	15,600	0	0
Sundry minerals		65,853	0	0
Total value		£93,536,963	13	9

*Annual Report Department of Mines, 1891.

COAL.

Coal, though discovered in the year 1796 or 1797, was not worked to any great extent till 1830.

The coal measures embrace an area of about 23,950 square miles. The seams worked vary from 3 feet to 30 feet in thickness, are nearly horizontal for the most part, but in places are inclined at a steep angle, and are in some localities considerably above sea-level. There are at the present time 102 colleries at work, employing in the aggregate, above and below ground, 10,820 miners and others. In addition to the foregoing there are four mines at which very valuable seams of petroleum oil cannel coal, or kerosene shale, are being worked. The number of men employed, above and below ground, is 260.

There are five principal coal-mining districts : the Hunter River or Newcastle Coal-field, situated to the north of Sydney ; the Southern or Illawarra Coal-field ; the Western or Lithgow Coal-field, upon the Great Western railway line, about 95 miles west from the metropolis ; the South-western or Mittagong Coal-field ; and the Namoi River or Gunnedah Coal-field. Coal is also being worked near Berrima, between Illawarra and Lithgow, and between Lithgow and Mudgee ; and some seams are known to occur in the country lying between Lithgow and the Hunter River. Sydney, therefore, occupies an almost central position with regard to the coal-mining districts, and actual proof of the proximity of workable coal to Sydney, is afforded by the Holt-Sutherland and Liverpool bores, the former between Botany Bay and Port Hacking, 17 miles from Sydney, and the latter on the Moorbank Estate, 26 miles south-westerly from Sydney by rail. At Holt-Sutherland the upper portion of the Bulli seam was struck at 2,228 feet, and was 4 feet 2 inches thick ; while the lower portion was proved at a depth of 2,299 feet to have a thickness of 5 feet 5 inches. At the bore at Liverpool, recently completed, a seam, 6 feet 6 inches thick, was struck by the drill at a depth of 2,579 feet 2 inches.

The following is an analysis of the coal obtained :—

Hygroscopic moisture	·85
Volatile hpdrocarbons	19·40
Fixed Carbon	67·40
Ash	12·35
	100·00

During the year the diamond drill bore which was being put down on Cremorne Point, Mossman's Bay, Port Jackson, by a syndicate who have secured the right to mine under Sydney Harbour, reached a coal seam at a depth of 2,801 feet 9 inches, but unfortunately a small intrusive dyke of ingenous rock was passed through just above the coal. As far as could be judged this seam is identical with the Bulli seam. The following is an analysis of the mineralised coal from the bore —

Hygroscopic moisture	1·40
Volatile Hydrocarbons	5·35
Fixed carbon	59·75
Ash	33·50
	100·00

Another bore is now being put down to the north of the site of the previous one, and probably outside the influence of the intrusive rock.

In addition, coal has been discovered in different parts of the Colony, viz., near Inverell, Denisontown, Dubbo, Barraba, Curlewis, Clarence, &c.

Judging by the fossil flora the Clarence River coal seams are of mesozoic age, and may probably be correlated with the Ipswich Coal Measures of Queensland. Owing to the presence of numerous partings and shale bands in the Clarence coal seams they are not likely to be largely mined for export in their natural condition. By careful picking local wants can be supplied from the thin bands of clean bituminous coal. With efficient washing machinery these seams may be largely availed of in the future for briquette manufacture.

The seams of coal at present worked occur in the Upper, Middle, and Lower Coal Measures, in both of which characteristic fossil plants of the genera *Glossopteris* and *Phyllotheca* are found, while associated only with the Lower Coal Measures are marine beds containing *Spirifera*, *Productæ*, and *Orthoceras*, with other fauna of Carboniferous age. In these Lower Coal Measures recent prospecting has proved the seams formerly worked at Greta to have thickened considerably to the south of Maitland. At the East Greta and Heddon Greta mines, in this locality, the upper seam is over 30 feet thick, and at the former mine the lower seam is 11 feet 8 inches. At East Greta a thickness of coal of 41 feet, exclusive of bands, has been proved within a vertical distance of about 100 feet, The Newcastle or Upper Coal Measures are believed to be of Permian age.

The seams of petroleum oil cannel coal, or kerosene shale, also occur in the Coal Measures. At Greta or Anvil Creek the shale forms irregular layers, sometimes over 6 inches thick, in the main bituminous coal seam; also at America Creek, in one part of the mine, the seam of kerosene shale was found to change into bituminous coal; but at the Joadja Creek and Hartley mines it forms distinct seams, attaining a thickness of 5 feet in the latter mine.

Kerosene shale occurs near Gulgong, Murrurundi, and several other localities. An extensive deposit has been recently found at Capertee, near the line of railway from Wallerawang to Mudgee.

"It has unquestionably resulted," says the late Rev. W. B. Clarke (writing upon the origion of shale), "from the local deposition of some resinous wood, and passes generally into ordinary coal, many portions of the same bed in the Illawarra mines exhibiting the impress of fronds of *Glossopteris* as plainly as they are shown in ordinary coal scale." * * * "Presuming that the origin above suggested is correct, viz., the occasional occurrance in the ancient deposits of trees of a peculiar resinous constitution, there is no anomaly in finding in one spot a mere patch amidst a coal seam (as in the case of Anvil Creek, on the Hunter River), or thick-bedded masses of greater area, as in the coal seams of Mount York or of America Creek, in the Illawarra, depending upon the original amount of drift timber." In a paper read before the Linnean Society of New South Wales, on 26th June, 1889, Mr. T. W. Edgeworth David, B.A., F.G.S., Geological Surveyor, attributes the origion of kerosene shale, as evidenced by its microscopic structure, to the local accumulation of sporangia—either land or acquatic plants.

GOLD.

Mining for gold in Australia commenced in the year 1851, but the discovery is recorded as far back as 1823. Mr. Surveyor M'Brian, in his field notes of the survey of the Fish River, between Tarana and O'Connell, states—"February 15th, 1823. At 81·50 to river," and marked gum-tree. At this place I found numerous particles of gold in the sand in the hills convenient to the river."

Recent investigation, indeed, has brought to light a Portuguese chart of the sixteenth century, on which the north-west coast of Australia has been marked as "the gold coast."

In 1839 Count Strzelecki found auriferous pyrites near Wellington.

In 1841—23rd and 24th February—Rev. W. B. Clarke, M.A., F.R.S., discovered gold in situ in the granite formation between Hartley and Hassan's Walls, and at the head of Winburndale Rivulet. He very shortly afterwards spoke of the abundance of gold likely to be found in the Colony, and as early as 1843 mentioned it generally. In 1844 he showed a sample to the Governor of New South Wales, Sir George Gipps, who said, "Put it away, Mr. Clarke, or we shall all have our throats cut."

Professor Sir Archibald Geikie, Director of H.M. Geological Survey of Scotland, in his "Life of Murchison" thus refers to Mr. Clarke's discovery of gold—"The first explorer who proclaimed the probable auriferous veins of Australia on true scientific grounds—that is, by obtaining gold in situ and tracing the parent rock through the country—was the Rev. W. B. Clarke, M.A., F.R.S., who, originally a clergyman in England, has spent a long and laborious life in working out the geological structure of his adopted country, New South Wales. He found gold in 1841, and exhibited it to numerous members of the Legislature, declaring, at the same time, his belief in its abundance. While, therefore, geologists in Europe were guessing, he, having actually found the precious metal, was tracing its occurrence far and near on the ground."

In 1843 or 1844, Macgregor, a shepherd, is said to have found gold in the Wellington district.

On 3rd April, 1851, Mr. E. H. Hargraves, who had recently returned from California, addressed a letter to the Colonial Secretary stating that he had been prospecting for two months, and offered to point out the localities in which he had discovered gold to any officer of the Government on condition of the Government awarding him £500 as a compensation. To this the Government directed that a similar answer should be given to that returned to the former proposal of Mr. Smith.

The distance between the Albert gold-field and the Delegete gold-field being 672 miles, and between the latter and the Ballina gold-field being 600 miles, it will be seen that gold-fields are distributed over the greater part of the Colony. Nothwithstanding that the search for gold has been carried on for forty years, new fields or new deposits are continually being discovered, some of them in localities which were supposed to have been thoroughly examined; while the older fields, though apparently exhausted as far as the miner, unaided by capital and skill, is capable of exhausting them, yet contain deposits of gold which will yield a rich harvest to the skilled miner who shall bring to bear upon them appliances such as are being successfully employed elsewhere.

Department E.—Mines, Mining, and Metallurgy.

Mineral Products of New South Wales.—Gold.

In order to encourage the introduction of such a system of mining as will lead to the profitable working of localities from which the operative miner can no longer extract a living by means of the pick and shovel alone, it will be necessary to provide security of tenure over comparatively large areas subject to the employment of necessary appliances and labour.

Gold has always been found in association with certain formations, and the extent of country occupied by these is about 70,000 square miles—or nearly one-fourth of the whole area of the Colony—a considerable portion of which has not yet been touched by the pick of the miner.

Gold-bearing quartz reefs have been found in New South Wales in sedimentary rocks of Upper Silurian Devonian, and Carboniferous ages; also in hornblendic granites, porphyry, diorite, basalt, and serpentine; while the deposits which contain alluvial or waterworn gold in payable quantity, and which have been derived from the degradation of these formations, are of Permian, Cretaceous, Tertiary, and Quaternary ages.

Auriferous quartz reefs in the Upper Silurian formation have been worked at Hill End and Tambaroora, Trunkey, Temora, Mount Brown, &c.; in the Devonian, at Nana Creek, Boorook, &c.; in the Carboniferous, at Barrington or Copeland; in granites, at Braidwood, Adelong, Timbarra, &c.; in porphyry, at Grenfell; in diorite, at Gulgong, Temora, Parkes, &c.; in serpentine, at Gundagai, Lucknow, &c. The reefs vary from a few inches to 10 feet in width, though occasionally they attain a greater thickness. They generally have meridional strike, especially where they traverse the Silurian formation; but in many localities the strike runs in other directions. Thus at Hill End, Trunkey, and Adelong, the prevailing strike is about N. and S.; at Dalmorton, from E. 10° N. to E. 30° S.; at Grenfell, N.E.; at Temora and Copeland, from N.E. to E. and S.E.

In these reefs the gold seldom occurs without one or more of the following sulphurets: Pyrites, galena, mispickel, blende, and copper pyrites; calcite is also frequently present, and barytes rarely. At Hill End portions of the reefs contain potash mica (muscovite). "In some places the mica was found to entirely replace the quartz, and here the gold was found to be excessively rich."* These reefs traverse chlorite slate, clay slates, and metamorphosed conglomerates; the latter contain obscure impressions of *Encrinites Spirifera* and *Farosites*.

At Hill End Reefs of phenomenal richness were worked about 1871–72 to comparatively shallow depths on the summit of the hill; to prove their persistence in depth, a tunnel (crosscut) has lately been driven into the base of the hill at a level 1,200 feet below the out-crop of the veins on the hill summit. This practical prospecting has been rewarded by the discovery of three payable reefs, which, though small, are rich. It is probable that a considerable revival in reefing will ensue in this district.

Important discoveries of gold-bearing lodes have recently been made at Peak Hill, in the Parkes district, and at Pambula, on the South Coast. In both places large deposits of payble stone have been proved by prospecting operations.

Owing to the fineness of the gold and the peculiar nature of the gangue in the Pambula lodes, considerable difficulty has been experienced in saving the gold by mechanical treatment: Chlorination is needed to efficiently treat the ore. The gangue is essentially felspathic, consisting of silicate of alumina and free silica. The richness of some of the lodes may be judged by the yield from 120 tons from the Faulkner Mine, viz., 1,890 oz.

The Peak Hill lodes have been proved to yield from half to 1 ounce of gold per ton.

The rich quartz veins at Lucknow occur along the line of junction of serpentine and hornblende porphyry; besides quartz, the vein-stuff includes calcite, asbestos, serpentine, and abundance of mispickel, also a little magnetite; the gold is sometimes visibly disseminated through the mispickel and serpentine. †

At Barmedman, in the Bland district, Mount Hope, in the Lachlan district, and at Cowarbee, in the Murrumbidgee district, gold is not only found in the veins of quartz with pyrites and galena, but also in the cleavage planes and joint-fissures of the adjoining slates. Near Glen Innes, in the New England district, it has been found in bismuth ores.

At the Brown's Creek Mine, 6 miles west from Blayney, an immense breccia lode has been worked for many years. The gold is disseminated in fine particles throughout the lode, and also in hard silicious accretions which have been formed by segregation in the lode stuff; the gold, therefore, has evidently been deposited from solution. The lode has been extensively worked, and yields an average of about 3 dwt. of gold per ton.

In the Hillgrove district, Lunatic, and at Ilford, gold occurs in quartz reefs, associated with antimony sulphide. Owing, however, to the present imperfect appliances for

* See Geological Map of Hill End and Tambaroora, by E. F. Pittman, Geological Surveyor.

† See "Report on Wentworth Gold-field," by C. S. Wilkinson, F.G.S., F.L.S., Government Geologist, in *Annual Report, Department of Mines.*

separating gold from antimony, a considerable proportion of the value of the gold in the antimony ore is not realised.

At Deep Creek, Nambucca, a valuable lode of auriferous mispickel is now being practically operated upon by a chlorination process. The contained arsenic being obtained as a marketable commodity; as also the sesqui-oxide of cobalt, which is present in the ore to the extent of 1½ per cent.

Rich gold has been found in a calcite gangue at Ti-tree, near Manilla.

On several of the gold-fields the reefs contain much pyrites, which, on assay, have been proved to be more or less rich in gold. New South Wales certainly affords a very promising field for the introduction of efficient economic appliances for the extraction of gold from pyrites.

Throughout the gold-fields, gold is always found to be more or less alloyed with silver and occasionally with traces of copper, iron, osmo-iridium, and other metals.

The greatest depth at which auriferous reefs have been worked in New South Wales is 1,050 feet, viz., in the Adelong United Gold-mine, Adelong.

At Araluen, Uralla, Timbarra, the Granite diggings, near Mount Brown, and other diggings where the formation consists of granite, the gold in the alluvium has evidently not only been derived from quartz reefs but also from the granite rock itself.

Near Rockley gold occurs in altered talcose schists.

The Permian deposits consists of pebble conglomerates, forming the base of the Coal Measures, or "*Glossopteris beds*," at the Tallawang diggings, and resting upon the Silurian schists traversed by quartz reefs from which the gold must originally have been derived. The conglomerate yields from 1 to 15 dwt. of gold per ton, while nuggets weighing 5 oz. have been obtained from it. The gold is generally in the form of flat scaly pieces, and waterworn.

Gold has been recently discovered in the marine conglomerates and shale beds, which are believed to be of Cretaceous age, and which rest upon the flanks of the Silurian, Devonian, and granite formations in the Mount Brown or Albert Gold Field.*

Of the Tertiary deposits, gold in payable quantity has been obtained from the Lower, Middle, and Upper Pliocene alluvia, chiefly from the two latter. Some of the deposits may be of Miocene or Eocene age. These are of fresh-water origin, and consist of ancient river-drifts of pebbles, sand, and clays, the remains of auriferous formations which had been disintegrated by denuding agencies during the erosion of the valleys. "The fossils found in these fluviatile deposits or 'deep leads' of the Middle and Upper Pliocene beds are very numerous. Large trunks, branches, leaves, and fruits of trees, with ferns, bones of extinct marsupials and birds, remains of insects and fresh-water mussell-shells, have been exhumed from the clays and gravels of these old river beds. Of the fossil fruits, Baron von Mueller, K.C.M.G, M. and Ph. D., F.R.S., the distinguished Government Botanist of Victoria, whose researches have thrown so much light upon the character of the vegetation of this period, has described no less than thirteen genera and sixteen species of extinct forms, some of which have living allies."

In many localities the old river beds, or "leads," as the miners term them, have been overwhelmed by flows of volcanic rocks, which are sometimes 200 feet thick; consequently shafts have to be sunk through the basalt, as on the Forest and other gold-fields, to reach the gold-bearing gravels; but where, as on the Cudgegong River, the basalt has been completely cut through by the subsequent erosion of the valleys, the leads may be readily worked from adits driven under the basalt.

From 1,546 loads of wash-dirt from one of the rich claims (four men's ground) on the Happy Valley Lead, near Gulgong, 6,203 oz. of gold were obtained; and from a claim on the Canadian Lead, on the same gold-field, seven men in three years obtained, free of all expenses, gold to the value of £28,000. One ounce of gold per load, though above the average yield, is not an uncommon return from the wash-dirt of the Pliocene leads. But upon the Gulgong, Parkes, Forbes, and other fields of gold-bearing fame, some of the leads have been followed into deep ground where, owing to the heavy influx of water, they could not be further profitably worked by the ordinary manual efforts of the miners. However, with the aid of steam-power and improved gold-saving appliances, they will probably afford remunerative employment for many years to come.

During the past year drill-boring has been successfully prosecuted in the Gulgong Gold-field, and by this means one and a-half miles of an alluvial lead has been proved, at an average depth of about 160 feet; the wash averaging from 2 feet to 3 feet 8 inches in thickness.

The Quaternary or Post Pliocene and recent gold-bearing drifts are found in all the alluvial flats through which the rivers and creeks meander, and in the more shallow ground, or "surfacing," upon the sides and summits of the hills, in proximity to the rocks

* See "Report upon the Albert Gold-field," by Henry Y. L. Brown, Geological Surveyor.

and reefs from which the gold has been derived. On many of the gold-fields these deposits proved immensely rich, and on account of the facility with which they could be worked, by even inexperienced miners, they were quickly exhausted, excepting in localities where water was scarce, and there are many such places, where the surfacing will pay to re-work by ground-sluicing when a sufficient supply of water can be brought to operate upon it.

On the Mount Brown Gold-field, in the north-west part of the Colony, where there is a scarcity of water, owing to the aridity of the climate, large quantities of gold have been obtained from the alluvial by dry-blowing, which is a tedious and troublesome process for the miners. Latterly, however, two patents have been taken out—one by Messrs. C. Phillips and Co., and the other by Captain Park—for inventions of dry-blowing machinery for treating dry and loose gold-bearing deposits; public trials of these machines proved successful.

The quantity of gold raised in the Colony to the end of 1891 amounted to 10,373,452 oz., of a value of £38,633,477.

SILVER.

Silver-mining in New South Wales dates from the opening of the Boorook silver-bearing lodes, near Tenterfield, New England, in 1879. The lodes, which are several in number, occur in belts of felspar porphyry alternated with beds of fossiliferous shales of lower carboniferous age. From the surface to the water-level the ores consisted of soft ferruginous claystones and quartz, carrying chloride and a little iodide of silver, and gold in payable quantity; below the water level the ores changed to bluish claystones and quartz, carrying pyrites and a little blende, and became more difficult of treatment. A considerable amount of silver and gold was obtained from the more easily worked surface ores.

In 1884, however, silver-mining in the Colony practically became established as an important and rapidly increasing source of national wealth; for in that year the silver lodes of the Barrier Ranges in the extreme western portion of the Colony, those of Sunny Corner or Mitchell, in the Bathurst district, and the Emmaville and Pye's Creek lodes in the New England district were opened.

The value of the silver, silver-lead, and silver ore produced in the Colony up to the 31st December, 1891, amounted to £11,302,095.

Referring to Broken Hill, where the now celebrated silver mine is situated, Mr. C. S. Wilkinson, F.G.S., F.L.S., the late Government Geologist, says: "Broken Hill, so-called from the rugged outline of its rocky summit, is the highest point on a narrow ridge, which runs north-east and south-west for several miles, and forms a conspicuous feature in the district, rising for about 150 feet above the general level of the undulating plain country on each side. The crest of the ridge is formed by the outcropping of a huge lode. The lode varies in width from 10 to 120 feet, and in places rises above the surface in large craggy black masses (mangauiferous oxide of iron)."

The same authority, in describing this lode on a subsequent occasion, when it had been proved to a depth of 316 feet, states that "It is a true fissure lode, varying in width from 10 feet to 160 feet, and consists chiefly of porous iron and manganese oxides, in places more of less silicious, containing carbonate of lead and chloride of silver, with occasionally carbonates of copper and zinc. The lode continues northerly with much the same character, narrowing and widening in places through Block 14, Blocks 15 and 16 (British blocks), and Broken Hill Junction, beyond which it seems to continue in irregular smaller lodes of a more silicious nature, containing argentiferous galena and carbonates of lead and copper, with a little chloride of silver. To the south it passes into quartzite lodes, containing silver, lead, and copper ores sparingly distributed through the lodestuff."

From the following figures extracted from the reports of the Proprietary Company up to date, 30th November, 1891, it will be seen that this great mine bids fair to rival, if not surpass, the famous Comstock lode of the Pacific Slope. The net profits for the half-year ending 30th November, 1891, amounted to £633,737 10s. 8d., of which £576,000 was paid in dividends. The total dividends and bonuses to the above date amounted to £3,896,000.

The total quantity of ore treated being 803,497½ tons, yielding 30,757,505 oz. of silver, 125,102¼ tons of lead. Net amount realised, £7,059,175 13s. 5d.

The Company's plant consists of fifteen 80-ton smelters, also very complete concentratiug, leaching, and refining works, the latter at Port Pirie. An agreement has been made with the Tarrowingee Flux Company by which a regular supply of valuable limestone flux is obtained at a saving to the Proprietary of at least £30,000 per annum.

A supply of water has been secured from the Acacia Valley in connection with British Blocks, Block 14 and Block 10 Companies, who have together formed a trust for the

conservation and regulation of the water supply from that source. A 6-inch service pipe with adequate pumping machinery has been laid down to connect with the mines mentioned. The storage capacity of the Proprietary reservoirs and dams equals 15,000,000 gallons.

Arrangements have been made by the Proprietary Company for the practical testing—by boring—of the country lying between Broken Hill and Menindie for artesian water supply, as advised by Mr. Geological Surveyor Anderson and Mr. Dixon of Adelaide.

The outcrop of the Broken Hill lode in the Proprietary Company's ground is being quarried by contract, and vast quantities of good grade ore and ironstone flux obtained at a small hewing cost. The removal of the vast ironstone capping is also likely to relieve the strain on the mine timbers. Not a little difficulty is likely to be experienced in keeping open such a huge fissure when the ore body is removed, the average width of the lode being not less than 50 feet, and in some parts it exceeds 200 feet in width.

At the Broken Hill Proprietary, Block 10 Mine, the work of exploration and development was vigorously carried on during the half-year ending 31st March, 1892. Shafts and winzes were sunk, and levels and cross-cuts driven to the extent of 1,428½ feet. Important and extensive surface works were also constructed, the greatest depth attained being 633 feet; the lower 106 feet was sunk during the half-year ending 31st March, 1892; the whole in sulphide ore averaging 23 oz. of silver, 20 per cent. of lead, and 23 per cent. of zinc.

During developmental exploration, 32,000 tons of sulphide ore have been raised to the surface, the average yield of which is estimated by careful assays to be 34·88 oz. of silver, 22 per cent. of lead, and 28·87 per cent. of zinc.

The total dividends paid to date, 31st March, 1892, amount to £360,000.

The cost of treatment, including mine wages, smelting charges, railway, and all other incidental expenditure, amounted to £7 6s. 10d. per ton of ore.

The Broken Hill Proprietary Block 14 Company suffered, in common with the other principal mines in this district, on account of scarcity of water for smelting and dressing purposes. Notwithstanding this drawback, however, substantial progress has been made, and fair dividends paid. The difficulty as regards a supply of water has been practically overcome; an arrangement having been mutually arrived at between the principal Broken Hill mines for a supply of water from the Acacia lime-beds, about 10 miles distant, by means of iron pipes.

The Company has recently leased the Broken Hill Junction Smelting Works at Port Adelaide. The two furnaces at these works, and the three at the mine, are capable of treating about 1,400 tons of ore per week; a fourth furnace is in course of construction at the mine.

The greatest depth attained in this mine to the end of March, 1892, was 500 feet, 584 men being employed in the mine and works. The cost of smelting amounted to £2 6s. 9½d. per ton of ore. The dividends during the half-year amounted to £52,500, making a grand total, since the commmencement of smelting in October, 1891, of £195,000.

The following analysis of sulphide ore from the 400 feet level in the main shaft is of interest as showing the character of the ore which prevails throughout the whole course of the Broken Hill lode below the water-level. The services of Professor Schnabel (an eminent German metallurgical expert) have been obtained for a term, on behalf of the mines on the lode, for the purpose of experimenting and reporting on the best method of treatment of ores of the character here indicated.

	Per cent.		Per cent.
Zinc	23·30	Manganese traces	1·00
Iron	7·40	Lime	1·20
Lead	28·20	Alumina	
Copper	1·20	Antimony	0·50
Sulphur	21·50	Arsenic	1·00
Insoluble residue	13·95	Moisture	0·10
Silver—26·2 oz. p. ton	·07	Losses	0·58

At the Central Broken Hill Silver Mine, during the half-year ending 31st December, 1891, the production amounted to 899,239 oz. of silver, 1,887 tons of lead, and 197 tons of copper; equalling an average per ton of 40·16 oz. of silver, 8·47 of lead, and 0·88 per cent. of copper.

During the same period £71,250 were paid in dividends.

In common with the other mines on the Broken Hill lode, the Central Mine suffered from want of water, which not only precluded the five smelters being kept in full work, but also seriously affected the water jackets; the metallic salts in solution in the water becoming concentrated from constant usage corroded the jackets.

Department E.—Mines, Mining, and Metallurgy.

Mineral Products of New South Wales.—Silver.

At the Broken Hill South Mine during the half-year ending 31st December, 1891, the total receipts were £130,866, whilst the expenditure amounted to £124,751, so that notwithstanding the large amount of developmental work performed, this mine has been self-supporting. The production for the year was 623,458 oz. of silver, and 1,531 tons of lead, the average yield being 40·17 oz. of silver per ton, and 8·7 per cent. of lead. The greatest depth attained is 632 feet.

Exploration and development have been pushed on, and good progress made. The surface works are of a most substantial and permanent character, including haulage plants, two 80-ton smelters, tanks and dams, and tramway to connect with Silverton tramway line. It is satisfactory to note that the chief cost of these important developments is defrayed from the proceeds of sale of ore raised during the prosecution of the work.

The British Broken Hill Proprietary Company have had to contend with an extensive fall of ground, which caused a considerable expenditure of time and capital to re-open and secure, and only recently has it been possible to resume work in the region affected. In the last report placed before the shareholders in November, 1891, it was stated that a valuable discovery of lead-bearing ironstone, very suitable for fluxing, had been made on the Company's property, thus saving the necessity of purchasing ironstone flux.

A market has been found in the Colony for a fair quantity of carbonate of lead ore, which, though rich in lead, is poor in silver.

A new type of furnace devised by the general manager has been found very suitable. Owing to the realisation charges for low grade bullion being very high it has been found advantageous to enrich the Company's bullion by the purchase of small quantities of rich ore from the Proprietary Mine to smelt with the poorer lead ores from the Company's mine.

At the Broken Hill North Mine a concentration plant, capable of treating 90 tons of ore per day has been erected. At the Australian Broken Hill Consols Mine two very valuable discoveries of rich ore have recently been made, large masses of chloride and native silver being obtained in a solid state.

A considerable quantity of ore has been raised from many other mines in this and the Silverton districts. The following export is recorded for 1891 for the districts mentioned :—

Silver-lead bullion, 54,722 tons ; valued at £2,539,685. Silver-lead ore, 93,942 tons; valued at £985,408. Copper ore, 203 tons ; value, £3,955. Total value, £3,529,043.

The Sunny Corner lode, which occurs in altered Silurian rocks intruded by elvanite, was originally worked for gold in 1875. The argentiferous nature of the lode stuff was demonstrated by Mr. H. Y. L. Brown, Geological Surveyor, who, in 1881, inspected and reported on the mine. (See Annual Report, Department of Mines, 1881.) The oxidised ores consisted of porous silicious gossan and stalactitic brown iron ore ; nests of native silver were occasionally visible in the cavities of the gossan. Below the water-level the ore changed into a refractory mixture of sulphides of iron, copper, lead, and zinc.

The matter produced during 1890 was valued at £72,642 17s. 9d.

During the year 1890, 35,287 tons of ore were raised ; 39,046 tons were treated, producing 404,606 oz. of silver, 344 tons of copper, 4,048 oz. of gold, and 25 tons of lead, of a total estimated value of £104,565.

At the old Nevada Mine, 1,700 tons of ore were raised, of which 1,020 tons were sent to Lithgow for treatment, and 680 tons were smelted at the mine, producing 110 tons of matte, valued at £3,080.

The principal argentiferous lode opened in the New England district in 1884 was that of the Webb's Mine, about 7 miles north-west of Emmaville. The rocks in which the lode occurs are described by Mr. T. W. E. David, B.A., F.G.S., as altered palæozoic claystones and mudstones, in some places passing into argillites. The lode stuff is brecciated, and composed chiefly of slate rock, with strings and bunches of quartz ; the metalliferous contents consist chiefly of galena, mispickel, copper pyrites, and argentiferous tetahedrite.

During 1891 the ore raised, hand-picked and machine-dressed, yielding 354 tons of concentrates, assaying 85 oz. per ton.

Mount Galena, a new discovery on a parallel lode to the latter mine, gives very favourable promise of payable developments ; 190 tons of picked ore was sent away for reduction during 1891.

At Borah Creek, near Inverell, a payable deposit of silver-lead ore has recently been opened ; and other claims in the locality are being vigorously prospected.

Webb's Consols, Castlerag, Castle King, Castle Wellington, and Pye's Creek Mines, are all more or less argentiferous lead lodes of varying richness and permanency from which considerable quantities of ore will be raised.

At Wollomombi rich silver-sulphide ore in quartz vein stone has been recently discovered, and preparations are being made to develop the mine.

At the White Rock Silver Mine, about 3 miles from Fairfield, the large and expensive plant, erected at great cost, proved unsuitable. At the present time the mine and works are practically shut down. From the fact, however, that the concentrates are rich in silver, and that unlimited quantities of ore can be readily quarried from the exposed face, containing a fair proportion of concentrates, there can be little doubt that, with more efficient treatment, this mine will yet prove payable. A trial parcel of 10 tons of this ore has recently been treated by the Lührig Concentrator, under the supervision of Mr. Cosmo Newberry, C.M.G., with very satisfactory results.

At Rivertree, New England, sulphides of silver occur, and a leaching plant is being erected as most suitable for the extraction of silver.

The Mount Costigan Mine is situated at Tuena, County of Georgina. Smelting was commenced in two furnaces in July, 1887, and 4,565 tons of ore were treated, yielding 106,084 oz. of silver, 659 oz. of gold, and 359 tons of lead, of a total value of £26,361. Here, as at the Cordillera Hill and Peelwood Mines, in the vicinity, the New Lewis Ponds Mine, near Orange, the Sunny Corner Mine, in the Bathurst district, at Captain's Flat, and, in fact, in many other mines within the Colony, below the water-level the ore changes in its character from easily-worked plumbiferous gossany ores to refractory sulphides, in which zinc sulphide largely abounds. Hence there is a great future in store for the discoverer of a suitable economic process for concentrating and treating such ores; in fact the permanency of silver-mining depends, upon such a discovery, especially that of efficient concentrating machinery.

It is probable that the Mount Costigan will shortly be again opened.

It was earnestly hoped that some practical results would follow the investigations of the eminent German metallurgist, Dr. Schnabel, of the character and most advantageous method of treatment of the Broken Hill sulphide ores from below water-level. The pith of his lengthy report is that these ores—sulphides of lead and zinc in about equal proportions—can only be treated with profit at the seaboard. A double treatment being necessary, roasting and leaching to remove the zinc; and smelting of the residuum for silver-lead bullion. There is no doubt as regards richness and quantity, the Broken Hill sulphide deposits compare more than favourably with profitably-worked Continental deposits of similar character. The great drawbacks to highly-profitable working in New South Wales being the price and uncertainty of labour, excessive cost of fuel, and distance from seaboard.

At the Mount Stewart Silver Mine, Leadville, an 80-ton water-jacket smelter has been erected, and the large amount of ore raised during the prospecting operations, which have been systematically carried on for a considerable period, is now being profitably smelted.

The Commodore Vanderbilt Company, at Captain's Flat, smelted 5,657 tons of gossan ore, producing 63,750 oz. of silver, 86 tons of lead, and 802 oz. of gold.

A considerable amount of systematic prospecting has been done on the Wallah Wallah silver lode in the Burrowa district, and payable ore has been proved in several shafts on the course of the lode; at the lowest depth reached the ore was improving in value.

A very rich argentiferous bismuth ore has recently been discovered at Whipstick, near Pambula.

COPPER.

The principal copper mine in New South Wales is the Great Cobar Mine, and it is the most distant from the seaboard, being 497 miles west of Sydney.

The lode occurs in Silurian slates; it varies in width up to 100 feet. On the surface appear the outcrops of two adjacent parallel lodes; it is believed, however, that all three form one lode, being only separated by pieces of ground known to miners as "horses."

The ores consist of carbonates, metallic copper in films, red oxide, and grey and yellow sulphides. The greatest depth obtained by sinking the main shaft is 564 feet, from which level diamond-drill bores have been put down an additional 60 feet, the lode being 40 feet in width, of fair yellow sulphide ore. A new discovery has been made between the 29 and 36 fathom levels, which would average about 14 per cent. But, independently of this find, it will take years to work out the different copper ores in sight, and known to exist in the mine. An assay of the refined copper smelted from the above ores gave 99·65 per cent. of copper, 2 oz. 12 dwt. 4 gr. of gold, and 1 oz. 5 dwt. of silver per ton.

This mine has been shut down for some little time, but the opening of the Nyngan-Cobar Railway will probably cause a renewal of operations, as the line connects this great mine with the metropolis and with the coal-fields.

At Nymagee, in the Cobar district, a large and valuable copper lode is now being extensively worked. The lode traverses Silurian sandy slate formation, striking N. 17° 30′ W., and is nearly vertical. The ores consist of earthy blue and green carbonates, and grey and yellow sulphides. The metallic copper obtained from these ores is of the purest quality, being remarkably free from injurious foreign metals. An assay of it gave

99·74 per cent. of metallic copper, with 3 dwt. of silver per ton, and no gold. The Inspector of Mines, in his annual report for 1884, states that the yellow sulphide ore has been traced through the mine for a distance of about 500 feet, averaging in parts from 10 to 15 feet in width. The mine has now been opened to a depth of 734 feet.

During 1891 9,355 tons of ore were smelted at this mine, realising 901 tons of copper.

£94,000 has been paid in dividends since the formation of the Company, equal to 23s. 6d. on the 20s. shares.

In 1891 the New Mount Hope Mine produced 1,094 tons of ore, which yielded 280 tons of copper.

The Burraga Copper Mine has been closed owing to the low price of copper. The deepest shaft is 300 feet, and the lode is 15 feet wide.

Copper lodes have been opened, and more or less worked, in years past, at Peelwood, Cow Flat, Wiseman's Creek, Thompson's Creek, Carangara, Ophir, Cadia, Canoblas, Carcoar, Icely, Molong, Goodrich, Balara, Snowball, Frogmore, and near Goulburn; the existence of other lodes are known of in the Wellington, Murrumbidgee, New England, Bombala, Braidwood, Grafton, and Albert districts. In the last named, copper ore to the value of £3,955 was raised during 1891.

Considering the extent of our copper bearing country, the progress hitherto made in copper mining has not been so great as could have been desired.

TIN.

Tin, though discovered by the late Rev. W. B. Clarke so early as 1853, was not worked till 1872. Since that date to the end of 1891, tin ingots and tin ore to the value of £9,526,796 has been exported.

In addition to the alluvial deposits of tin ore there are numerous lodes, but the latter have not yet been worked to any extent on account of the capital and skill necessary for their proper development. The alluvial deposits first worked were found in beds of existing creeks, but more recently tin ore has been found in large quantities in beds of old rivers or creeks, at depths varying from a few feet to 200 feet. In some cases these deposits are covered by basalt.

At Vegetable Creek about three miles of deep leads only have been worked out since their discovery in 1873, and, according to Mr. Geological Surveyor David's report, there are about 46 miles of leads yet to be worked.

The tin-bearing localities hitherto worked are situated about the high lands of the Great Dividing Range in the Northern district. Several lodes have been opened, as at Tingha, Elsmore, Newstead, The Gulf, Jingellic, &c.; they occur chiefly in euritic and micaceous granites.

Quite recently a discovery of lode tinstone has been made on the Wilson River, about 35 miles from Kempsey on the Macleay River, but its extent has not yet been ascertained.

Gold, wolfram, metallic bismuth, and carbonate and sulphide of bismuth are occasionally found with the tin ore; sulphide of tin rarely. The concretionary variety of tin oxide called "Toad's-eye" tin occurs in the Pliocene gold drifts at Grenfell.

A considerable area of tin-bearing country has been discovered at Euriowie, in the Barrier Ranges, about 50 miles from Broken Hill. The tin lodes consist of granite dykes, traversing slates and schists. The tinstone occurs in irregular bunches in the lodes, and so far has not been extensively mined. Prospecting for tin has, however, lately received an impetus in this district.

IRON.

The existence of extensive deposits of rich iron ores at Wallerawang, Mittagong, near Picton, Berrima, Mount Lambie, near Blayney, near Cowra, Lyndhurst, Lue, Port Stephens, and in various other parts of the Colony, has been demonstrated—in many instances in the vicinity of coal and limestone in abundance; but owing to the heavy cost of erecting smelting and other works, and the difficulty of securing the necessary skilled labour, very little has yet been done towards developing this important source of wealth.

In fact, with the exception of the Fitzroy Works at Mittagong, which have been abandoned for some time past, the only works in the Colony are those of the Eskbank Iron Company at Lithgow Valley, which were originated in 1875. These works consist of furnace-foundry and forge, and rolling mills; the two branches are connected by a horse tramway. Most of the plant, including a 24-ton fly-wheel, was made on the ground. The blast furnace is capable of producing 100 tons of gray, or 115 tons of white iron per week. During 1889 2,136 tons 9 cwt. of bar and rail iron were made, valued at £18,330 10s. Upon this Company's property are iron ore, coal, fire-clay, and moulders' sand. Smelting has been abandoned for some time; the works being at present employed for working up old iron.

Irregular masses and veins of magnetite, with garnet ironstone, and some lodes of brown hæmatite, occur in the Devonian beds near Wallerawang, while interbedded with the Coal Measures, which extend from Wallerawang to Bowenfels, are several thin beds of rich clay-band iron ore— a variety of *hæmatite*.

According to analysis made by Professor Liversidge, the magnetite ore averages 40·87 per cent. of metallic iron, the garnet ironstone 21 per cent. of iron, the brown hæmatite 37·84 to 51·52 per cent. of iron, the clay bands 49·28 to 56 per cent. of iron.

The extensive deposit of brown hæmatite at Mittagong is a spring depesit formed at junction of the Hawkesbury and Wianamatta formations. Iron ore, consisting of red and brown hæmatite, occurs in the Hawkesbury rocks at Mount Clarence in considerable quantity. A sample analysed by Mr. C. Watt, Government Analyst, contained 55 per cent. of metallic iron. This ore is generally very silieeous.

At Brown's Creek, near Blayney, several considerable deposits of iron ore occur, which furnished the major portion of the ore used during smelting operations at Eskbank. A considerable quantity of rich brown iron ore was also obtained from Newbridge.

A few miles from Lyndhurst an extensive outcrop of rich brown iron ore in limestone occurs. At Broula, near Cowra, magnetic iron ore of very good quality is obtainable in quantity.

In 1890 considerable attention was given to the iron ore deposits of New South Wales, owing to the visit of an eminent authority—Mr. Ormiston—who was sent out by English capitalists, at the instance of Mr. Joseph Mitchell, for the purpose of making a report on the iron ore, coal, and limestone deposits of the Colony, with a view of establishing iron smelting works.

Mr. Harrie Wood, Under Secretary for Mines, in his Annual Report of the Department of Mines, 1890, states that "there are three localities favourably situated for the establishment of smelting works, viz. :—Near Mittagong or Picton, in the south-western coal-field, on the Great Southern Railway Line ; near Wallerawang or Lithgow, on the edge of the western coal-field, on the Great Western Railway Line ; and near Rylstone, also in the western coal-field, on the Wallerawang-Mudgee Railway Line. The ore in the two latter localities might, if required, be worked together, and smelted at some central works near Wallerawang, or other convenient site. The quantity of iron ores available for smelting works in the Mittagong or Picton district is estimated approximately at 8,234,000 tons, containing 3,684,000 tons of metallic iron ; in the Wallerawang district, 2,484,000 tons of ore, yielding 1,212,000 tons of metallic iron ; and in the Rylstone district, 2,226,000 tons of ore, containing 957,180 tons of metallic iron ; or a total quantity of 12,944,000 tons of ore, containing 5,853,180 tons of metallic iron.

In framing the above estimate of the quantities of iron ore available in the districts mentioned, only those deposits which are within reasonable distance of railway carriage have been considered.

ANTIMONY.

Antimony ores have been found in numerous parts of New South Wales, the principal lodes occur in the Macleay, Armidale, Clarence, Gulgong, Cudgegong, Coolongolook, Ilford, Bowra, and Bellinger districts. On the Munga Creek, near the Macleay River, the ore consists of oxide and sulphide of antimony, and occurs in irregular bunches, occasionally of a considerable size, enclosed in a quartz matrix, which forms the chief constituent of the lodes.

The lodes in the Armidale district are payably auriferous, but, owing to the present imperfect methods of separating gold from antimony, only a small proportion of the value of the gold in the ore is realised.

About 1,580 tons of antimony ore (stibnite) were raised in the Armidale district during 1891.

From the Clarence River district a small parcel of stibnite was shipped, but the proceeds did not warrant extensive operations at the present time.

A deposit of rich oxide of antimony (cervantite) occurs near Ford's Creek, Gulgong but is rather patchy in its mode of occurrence.

Ore of good quality is now being raised in the Nambucca district.

LEAD.

Ores of lead, especially galena, which is often found argentiferous, are frequently met with in the gold-bearing veins in the Silurian, Devonian, and granite formations. Sometimes the ores are contained in matrices of fluorspar and barytes. The lodes of galena which have been opened have not as yet been worked with profit, excepting those which have been worked as silver ores.

Department E.—Mines, Mining, and Metallurgy.

Mineral Products of New South Wales.—Chromite, Manganese, Bismuth, Platinum, Zinc.

Lead ores, chiefly galena, are found in the following and other localities :—Mount Grosvenor, Peel (near Bathurst), Glen Innes, Yass, Darby's Run (near Tingha), Brook Creek, Gundaroo, Silverdale (near Bowning), Bookham (in the county of Harden), Wiseman's Creek, Murrumburrah, Camberra Plains, Mitchell's Creek, Bungonia, Peelwood, Bombala, Barrier Ranges, Tuena, Drake, and Emmaville.

Lead in the form of silver-lead bullion and silver-lead ore is now exported in enormous quantities annually. (*See* under Silver.)

CHROMITE AND MANGANESE.

Chromic iron and manganese ores have been found in considerable quantities, but cannot at present be profitably worked, owing to the cost of carriage to the sea-board. The chief chromic iron deposits in New South Wales are at Nundle, on the Peel River; at Bingera ; Pucka, in the Clarence River district ; in the Cooma district ; near Yung; and Gundagai.

The principal manganese deposits are at Bendemeer, Glanmire, Rockley, Pucka, and near Cooma.

BISMUTH.

Bismuth ores have been found in the tin-bearing drifts, and also in lodes at Silent Grove, The Gulf (in the Vegetable Creek district), Kingsgate (near Glen Innes), Elsmore, Tenterfield, Gumble, Captain's Flat, Mount Gipps (near Silverton), Adelong, Nimitybelle, near Pambula, and near Germanton.

A deposit of bismuth ore has recently been opened in the Broken Hill district, and ore is now being raised by a small party of miners.

The quantity exported to the end of 1891 was 168 tons ; value, £36,641.

The deposits at Kingsgate, about 18 miles from Glen Innes, occur as "pipe-veins" of quartz in granite, near its junction with slate. The ores consist of metallic bismuth (in pieces up to several pounds weight), oxide, sulphide, and carbonate of bismuth. A considerable quantity of the ores were raised in this locality, but operations were suspended some few years since. More efficient machinery is required for their treatment, as it is well-known that a large proportion of the friable, earthy carbonate, and oxide, was lost in manipulation with the means employed, and for want of proper concentrating appliances.

PLATINUM.

Platinum in small grains has been found occasionally in the gold-drifts in various parts of New South Wales. Its occurrence in the beach sand on the north coast, between the Richmond and the Tweed, has been known for many years. Fine gold occurs associated with it in the black sand on the coast. Beach-working for gold has been carried on at intervals for a long period, especially after easterly gales. In the ordinary miners' cradles, with which the gold is obtained, a small quantity of platinum collects from time to time on the blanketings, but no efficient means are at present known for saving the platinum on a large scale. Possibly the great advance in value of platinum will lead to practical efforts being made to work these platiniferous and auriferous beach sands, which occur in large quantity.

The black beach sand consists chiefly of titanic iron, coloured and colourless zircons, and sometimes a little tin. The platinum particles being excessively small, sizing will be necessary before concentration is attempted.

Recently, and for the first time in the Colony, platinum has been discovered in a lode formation, viz., near Broken Hill. Assays have revealed its presence up to 1 oz. per ton in the lodestuff.

Investigations as to the character and yield of the ores of this deposit have lately been carried out in Europe, Adelaide, Melbourne, and in the laboratory of the Department of Mines, Sydney ; the general opinion being that the platinum occurs in a very fine state of division, and in too small a quantity to be worked with profit.

Traces of platinum have also been found in the Parkes and Orange districts, and in small quantity associated with the auriferous drifts in the Mudgee and Shoalhaven districts.

ZINC.

Though zinc ores have not yet been commercially worked in New South Wales, they are known to exist in considerable quantity in several localities ; as at Broken Hill, Pye's Creek (near Bolivia), Vegetable Creek, near Deepwater, and Drake. At all of the above places there is one prevailing ore—zinc blende or zinc sulphide. At Bredbo, in the Cooma district, a deposit of carbonate of zinc, assaying 50 per cent. of metallic zinc, was prospected, but was reported to pinch out in depth.

Department E.—Mines, Mining, and Metallurgy.

Mineral Products of New South Wales.—Tungsten, Cobalt, Nickel, Mercury, Building Stones.

In the Broken Hill district the great silver-lead lodes below the water-level pass into argentiferous zinc—lead sulphides, from 20 to 30 per cent. of the ore being zinc sulphide, causing these silver-bearing ores to be refractory and difficult of treatment in the ordinary way. There is little doubt but that a large proportion of the zinc in these ores will be conserved in the near future, instead of being eliminated as at present, the value of the zinc being double that of the lead with which it is associated, and that this rich and important district will be the source of a large zinc production.

TUNGSTEN.

Recently attention has been drawn to tungsten ores owing to the great advance in their value, £30 per ton for 75 per cent. wolfram (tungstate of iron and manganese) being offered in Berlin. Several deposits are known in this Colony, as in the Vegetable Creek district, New England, Hogue's Creek (near Glen Innes), near Mount Hope (in the Lachlan River district), near Cooma, and Wagga Wagga, but so far no really workable deposits have been discovered.

Scheelite (tungstate of lime) occurs at Hillgrove (near Armidale) and at Cordillera Hill (near Tuena); in the first case associated with auriferous antimony lodes, and in the latter with argentiferous lead ores.

COBALT AND NICKEL.

Cobaltiferous manganese oxide occurs in the Port Macquarie and Bungonia districts, New South Wales. The most important discovery of cobalt ore has, however, been recently made close to the town of Carcoar, on the southern branch of the Great Western railway line. It consists of cobalt arsenide, which has been ascertained by assay to contain up to 18 per cent. of cobalt. The ore occurs in bunches on a line of fissure formed by an intrusive dyke of very hornblendic diorite. The latest developments of this deposit are very promising. A shipment of 50 tons yielding £36 per ton in London.

So far no deposits of nickel ore have been discovered in New South Wales; though traces of protoxide of nickel occur in most of the cobaltiferous manganese oxides of the Colony.

MERCURY.

Cinnabar (sulphide of mercury) has been found near Rylstone, on the Cudgegong River, where it occurs disseminated through a Tertiary drift. Cinnabar was also found in small quantity at Grove Creek, Abercrombie Ranges, and near Scone, but the source of supply was not discovered in either case. In 1890, however, cinnabar in lodestuff was discovered near Bingera and near Solferino. At Bingera its occurrence in the alluvium and surface soil was noted for some years prior to the discovery of it in situ in lodestuff. The latter consists of a serpentinous rock, forming a dyke mass of considerable thickness, in about 8 feet of which traces of cinnabar are found. The cinnabar occurs chiefly as small grains in joint cracks. Prospecting is now being carried on, but, so far, the proportion of ore to gangue has been found too small to be remunerative. The discovery near Solferino is in a quartz and felspathic veinstone about 12 feet thick, and offers favourable prospects of a payable deposit being found as operations are extended.

BUILDING STONES, MARBLES, CLAYS, OCHRES, &c.

Sandstone, granite, porphyry, flagging, marble limestone, slate, fire-clay, and brick and pottery clays occur in abundance in New South Wales. The city of Sydney is built upon the Hawkesbury formation, which contains thick beds of sandstone, affording stone of the finest quality for building purposes. It varies in colour from white to light brown, and is largely used in the erection of the better class of buildings in Sydney; it is also exported to the adjacent colonies. The granite used in Sydney is chiefly obtained from Moruya, Montague Island, and Gabo, but it is also available near Goulburn and in other localities. A handsome verde antique porphyry is obtainable near Cowra. A very durable syenite is quarried at Mittagong for railway purposes; the piers of the Hawkesbury railway bridge are constructed of this stone. Excellent sandstone flagging is quarried near Orange, Burrowa, and Buckingbong, near Narrandera.

Marble limestone of Siluro-Devonian age occurs in masses of large extent near Wallerawang, Bathurst, Orange, Marulan, Tamworth, Kempsey, &c. It takes a good polish, and may be obtained in various colours—white, black, grey, red, purple; it is chiefly used for decorative purposes. Serpentine of excellent quality occurs near Bingera and in other localities, but has not yet been worked. Slates of good quality for flagging, but not sufficiently cleavable for roofing purposes occur in the Bathurst, Goulburn, and Gundagai districts. Beds of fire-clay are numerous in the coal measures, and the Wianamatta shales afford excellent material for pottery and brick purposes.

Department E.—Mines, Mining, and Metallurgy.

Mineral Products of New South Wales.—Gem Stones, Asbestos.

NEW SOUTH WALES GEM STONES.

These include the diamond, sapphire, oriental emerald, emerald, ruby, opal, amethyst, garnet, chrysolite, topaz, cairngorm, onyx, &c., which have been found in the gold and tin-bearing drifts and river gravels in numerous localities throughout the Colony. From the alluvial deposits in the Bingera, Inverell, and Cudgegong districts, at least 50,000 diamonds are stated to have been found; the largest weighed about 5$\frac{5}{8}$ carats. It is interesting to note that some of the largest of the diamonds are fragments, very perfect cleaved fractures being preserved. It is probable, therefore, that stones of considerable size will be found in situations affording more favourable conditions for their preservation. So far the true matrix of the diamond has not been discovered in Australia. At the Cape Diamond Mines the matrix is a very basic igneous rock, intruding carboniferous strata. The occurrence of the diamond in New South Wales approximates to these conditions in so far as its presence (in drifts) in close proximity to igneous intrusions through carboniferous rocks is concerned, as at Inverell, Bingera, and Mittagong; but no trace of it in the intrusive masses has yet been found.

The following are the conclusions arrived at by Messrs. Thomas Davis, F.G.S., and R. Etheridge, jun., who, at the request of the Agent-General for the Colony, examined a parcel of 285 stones, forming an exhibit at the Colouial and Indian Exhibition:—

1. The diamonds of New South Wales in their physical character are more nearly allied to those of Brazil than any other country.
2. They have been very largely sold in London as such.
3. As regards colour, they differ practically but little from those of other fields.
4. The general absence of "cleavage" and "macles" is a point much in their favour.
5. Stones of the rarer colour assumed by the diamond should be particularly sought for.
6. The greater hardness of the New South Wales gems will probably raise the cost of cutting, but this will be compensated for by their extra "brilliancy."
7. Boart should be eagerly sought for.
8. Detailed statistics of the area and thickness of drifts likely to prove diamondiferous, and the number hitherto found so, should be prepared officially.
9. All auriferous drifts should be prospected for diamouds.
10. The matrix of the diamond in New South Wales bears no resemblance to that of the Cape.

An important fiud of emeralds of good colour and quality has recently been made near Emmaville. The emeralds occur at the junction of granite and slate, and have been traced for a considerable distance in limited quantities, and of varying colour and quality. In some instances the gems occur in the altered slate, in others in the granite, largely associated with topaz and fluorspar; others again have been found in solid mispickel in the altered slate. In the latter the stones were of excellent colour. A parcel of these stones forwarded to England for valuation and report have been valued at £3 3s. per carat. In places the emeralds give way to beryl, a gem which has been familiar to miners in this district ever since the opening up of the tinstone leads in 1872.

Another important fiud is that of noble opal at White Cliffs, on Momba Station, about 57 miles from Wilcannia, on the River Darling. The opal occurs in thin veins in sandstone, fossil wood and shells being frequently met with in which the original organic matter has been wholly replaced by opalescent silica. Stones of splendid quality have been obtained, and found ready sale within the Colony. The Under Secretary for Mines (N.S.W.) estimates that £15,000 worth of opals were raised in this district during 1890.

Sapphires, both blue and green, are found in considerable quantities in the Colony, but not of good quality, the colour, as a rule iu the best stones, being too dark, which gives them an opaque appearance when mounted.

Topaz, colourless and blue, are found in many localities, the latter forming very beautiful stones when cut. Beryls of commercial value are obtained in the stream tin workings in New England.

ASBESTOS.

Asbestos in veins in serpentine is found in the Gundagai, Bathurst, and Broken Hill districts. The deposits in the Bathurst district are inferior in fibre to those of Gundagai, but will, no doubt, eventually come into demand for paint and felting purposes.

Very recently at Red Hill, near Broken Hill, a large deposit of asbestos has been discovered, and is being vigorously prospected. Its quality is fair, though not equal to the Gundagai asbestos.

At Jones' Creek, near Gundagai, about 70 tons of good quality asbestos were raised; the deposit, however, pinched out in a short distance, and prospecting operations were not continued. It is very probable that other deposits will make at intervals; alternate pinching and widening is characteristic of the famous Italian asbestos deposits.

ALUM.

Alum-stone occurs as an immense deposit at Bulladelah, Gloucester district, New South Wales. It yields from 60 to 80 per cent. of alum. The Australian Alum Company has erected extensive works for preparing the alum at Liverpool, England; the stone being shipped in the rough to the works.

Infusorial earth (tripolyte) occurs in quantity near Barraba, Lismore, Cooma, and the Warrumbungle Mountains, New South Wales, and will no doubt be of value in the future for the manufacture of dynamite, soluble silicates, and polishing powder.

Gypsum occurs in quantity in the western district, but no attempt has yet been made to work the large deposits known, beyond a prospecting shaft near Balranald where extensive deposits of good quality were proved to exist. It occurs also in quantity on the Booligal-Wilcannia road, at a spot known as the Gypsum Palace.

Mineral waters occur near Cooma, Dubbo, Mudgee, Mittagong, and Picton, and in the north-western portion of the Colony.

The following analysis, made by Mr. J. C. H. Mingaye, F.C.S., Analyst to the Department of Mines, show the composition of the mineral waters referred to :—

Mineral water from a bore at Ballimore, near Dubbo.

The water yielded on evaporation a total fixed residue of 224·62 grains per gallon, consisting of—

	grs. per gal.
Bicarbonate of sodium	183·10
,, potassium	12·83
,, lithium	·05
,, calcium	11·38
,, magnesium	9·36
,, strontium	trace
,, iron	·70
Chloride of sodium	6·92
Alumina	trace
Silica	·28
	224·62

Trace of phosphates.
Free ammonia, 0·052 parts per 100,000 parts.
Albuminoid ammonia, 0·003 parts per 100,000 parts.
Specific gravity of water at 65° F. = 1·00359.

Mineral water from the Flat Rock, Cooma District.

	grs. per gal.
Bicarbonate of calcium	52·08
,, magnesium	24·40
,, sodium	45·29
,, potassium	17·15
Chloride of sodium	5·04
Silica	·56
Alumina	trace
	142·52

Mineral water from Mittagong.

	grs. per gal.
Magnesium chloride	1·296
Potassium ,,	2·042
Sodium ,,	2 158
Calcium bicarbonate	2·041
Magnesium ,,	2·243
Iron	5·985
	15·765

Quantity and Value of Coal raised from the Opening of the Coal Seams to 1857 inclusive.

Year.	Quantity.	Average ℔ ton.	Value.	Year.	Quantity.	Average ℔ ton.	Value.	Year.	Quantity.	Average ℔ ton.	Value.	Year.	Quantity.	Average ℔ ton.	Value.
Prior to		£ s. d.	£			£ s. d.	£			£ s. d.	£			£ s. d.	£
1829..	50,000	0 10 0	25,000	1836..	12,646	0 9 1·06	5,747	1844..	23,118	0 10 8·34	12,363	1852..	67,404	0 10 11·33	36,885
1829..	780	0 10 1·23	394	1837..	16,083	0 9 8·81	5,828	1845..	22,324	0 7 10·27	8,769	1853..	96,809	0 16 1·51	78,059
1830..	4,000	0 9 0·00	1,800	1838..	17,220	0 9 9·05	8,399	1846..	38,965	0 7 0·46	13,714	1854..	116,642	1 0 5·63	119,380
1831..	5,000	0 8 0·00	2,000	1839..	21,283	0 9 9·73	10,441	1847..	40,732	0 6 9·01	13,750	1855..	137,076	0 12 11·96	89,082
1832..	7,143	0 7 0·00	2,502	1840..	30,256	0 10 10·86	16,498	1848..	45,447	0 6 3·38	14,275	1856..	189,960	0 12 4·06	117,906
1833..	6,812	0 7 6·73	2,575	1841..	34,841	0 12 0·00	20,905	1849..	48,516	0 6 0·45	14,647	1857..	210,434	0 14 0·97	148,158
1834..	8,490	0 8 10·00	3,750	1842.	39,900	0 12 0·00	23,940	1850..	71,216	0 6 6·77	23,375				
1835..	12,392	0 8 10·19	5,483	1843..	25,862	0 12 6·54	16,222	1851..	67,610	0 7 6·51	25,546		1,468,961	0 11 10·72	869,391

Table showing the Quantities and Average Value per ton of Coal exported to Intercolonial and Foreign Ports respectively, the Quantity of Coal consumed in this Colony, and the Average Price per ton of the Total Output of the Collieries, from 1858 to 1891 inclusive.

Years.	Exports to Intercolonial Ports.			Exports to Foreign Ports.			Total Exports.			Home Consumption.	Total Output and Value.		
	Quantity.	Average per ton.	Value.	Quantity.	Average per ton.	Value.	Quantity.	Average per ton.	Value.		Quantity	Average per ton.	Value.
	Tons.	£ s. d.	£	Tons.	£ s. d.	£	Tons.	£ s. d.	£	Tons.	Tons.	£ s. d.	£ s. d.
1858-1866	1,858,268	0 13 1·43	1,140,094	774,610½	0 16 8·24	619,409	2,632,278½	0 14 0·49	1,759,503	1,442,446	4,054,725	0 11 7·46	2,221,833 0 0
1867 ...	312,101	0 9 4·35	146,111	161,256	0 13 3·47	107,148	473,357	0 10 8·40	253,259	296,655	770,012	0 8 10·79	342,655 0 0
1868	329,052	0 9 5·76	155,975	218,984	0 12 5·29	136,226	548,036	0 10 7·96	292,201	406,195	954,231	0 8 9·08	417,809 0 0
1869	340,466	0 8 9·07	149,059	255,087	0 11 8·31	149,136	595,553	0 10 0·16	298,195	324,221	919,774	0 7 6·32	346,146 0 0
1870	335,564	0 8 6·02	142,656	242,825	0 10 3·57	125,025	578,389	0 9 3·07	267,681	290,175	868,564	0 7 3·54	316,836 0 0
1871	378,891	0 8 6·91	162,470	186,538	0 10 1·22	94,220	565,429	0 9 0·95	256,690	333,355	898,784	0 7 0·47	316,340 0 0
1872	394,052	0 8 8·11	170,947	275,058	0 9 11·46	136,914	669,110	0 9 2·42	307,861	343,310	1,012,426	0 7 9·92	396,198 0 0
1873	425,937	0 12 9·32	272,110	347,142	0 14 7·59	253,979	773,079	0 13 7·32	526,089	419,783	1,192,862	0 11 1·94	665,747 0 0
1874	467,583	0 13 8·30	320,119	405,442	0 15 4·76	312,128	873,025	0 14 5·81	632,247	431,587	1,304,612	0 12 1·37	790,224 0 0
1875	518,853	0 13 7·77	354,074	408,154	0 15 6·64	317,409	927,007	0 14 5·84	671,483	402,722	1,329,729	0 12 3·89	819,429 17 2
1876	542,952	0 13 8·45	372,045	325,865	0 15 6·45	253,166	868,817	0 14 4·70	625,211	451,101	1,319,918	0 12 2·06	803,300 5 6
1877	563,757	0 13 8·64	386,740	351,970	0 14 10·81	262,237	915,727	0 14 2·08	648,977	528,544	1,444,271	0 11 10·74	858,998 8 2
1878	623,323	0 13 8·77	427,954	383,097	0 14 7·69	280,452	1,006,420	0 14 0·93	708,406	569,077	1,575,497	0 11 8·28	920,936 7 4
1879	621,087	0 13 6·75	421,198	376,962	0 14 6·13	273,509	998,049	0 13 11·05	694,707	585,332	1,583,381	0 12 0·12	950,878 18 3
1880	550,672	0 11 2·67	309,004	202,684	0 11 5·70	116,295	753,356	0 11 3·48	425,299	712,824	1,466,180	0 8 6·36	615,336 11 7
1881	657,135	0 7 9·34	255,572	372,709	0 8 8·29	161,958	1,029,844	0 8 1·30	417,530	739,753	1,769,597	0 6 9·55	603,248 5 8
1882	760,226	0 9 9·54	372,334	501,319	0 10 11·50	274,699	1,261,545	0 10 3·09	647,033	847,737	2,109,282	0 8 11·97	948,965 0 0
1883	855,704	0 10 5·75	448,356	656,741	0 11 7·34	381,306	1,512,445	0 10 11·65	829,662	1,009,012	2,521,457	0 9 6·40	1,201,941 12 11
1884	994,087	0 10 8·66	532,938	696,676	0 11 5·14	398,167	1,690,763	0 11 0·15	931,045	1,058,346	2,749,109	0 9 5·71	1,303,076 19 11
1885	991,924	0 10 7·13	525,443	764,432	0 11 6·52	441,220	1,756,356	0 11 0·09	966,663	1,122,507	2,878,863	0 9 3·72	1,340,212 13 7
1886	1,027,775	0 10 7·22	544,824	708,090	0 11 4·31	402,178	1,735,865	0 10 10·93	947,002	1,094,310	2,830,175	0 9 2·53	1,303,164 4 1
1887	1,077,270	0 10 5·89	565,084	713,172	0 11 1·08	395,455	1,790,442	0 10 8·75	960,539	1,132,055	2,922,497	0 9 2·57	1,346,440 2 7
1888	1,039,764	0 10 10·25	504,293	884,108	0 11 3·77	500,179	1,923,872	0 11 0·78	1,064,472	1,279,572	3,203,444	0 9 1·02	1,455,198 4 1
1889	1,310,228	0 10 4·24	678,200	1,077,474	0 11 1·88	601,071	2,387,702	0 10 8·58	1,279,271	1,267,930	3,655,632	0 8 11·20	1,632,848 15 6
1890	1,149,544	0 10 6·96	608,108	672,330	0 11 3·31	379,065	1,821,874	0 10 10·04	987,173	1,239,002	3,060,876	0 8 4·29	1,279,088 19 5
1891	1,397,256	0 10 0·30	700,380	847,473	0 10 10·43	460.595	2,244,729	0 10 4·12	1,160,965	1,793,200	4,037,929	0 8 7·58	1,742,795 12 6
Total ..	19,523,471	0 10 11·85	10,726,088	12,809,598½	0 12 2·76	7,833,086	32,333,069½	0 11 5·75	18,559,164	20,160,757½	52,433,817	0 9 6·15	24,939,648 18 3

Group XLII.—Minerals, Ores, Native Metals, Gems and Crystals, Geological Specimens.

CLASS 290.—Collections of Minerals, systematically arranged.

CLASS 291.—Collections of Ores, and the associated Minerals, Diamonds, and Gems (rough, cut, and unmounted).

Crystallography.—Specimens illustrating the formations of the Earth, systematically arranged.

[GOLD.]

The weight of gold obtained to the end of 1891 was 10,373,452 oz., of a value of £38,633,477. Gold-mining, as hitherto carried on, has been principally confined to the working of river-beds and shallow alluvial claims and leads; in some instances the latter have been worked to a depth of 200 ft. Extensive areas of country are known to be auriferous, and there are the strongest indications of deep leads in various parts where no attempt has been made to work them. Except in some few localities, quartz veins have not been worked to a great depth. The deepest mine in the Colony is at Adelong, where payable quartz has been raised from a depth of 1,050 ft. The poor success which has often attended the working of quartz mines is largely attributable to ill-judged speculation, inexperience, and the absence of proper ore-separating and other mining appliances. It is known that much gold passes away in the tailings, and is lost in consequence of the imperfect appliances at present employed for the treatment of auriferous pyrites. Quartz-mining is, however, steadily progressing. Rich auriferous antimony reefs have been opened at Hillgrove, near Armidale. From the Baker's Creek Gold-mine in this locality 1,307 tons of stone yielded 17,293 oz. of gold—an average of 13 oz. 4 dwt. 15 gr. per ton. Bulk samples of auriferous gossan and pyritous ore from the lately discovered lodes at Peak Hill are exhibited. Specimens of auriferous quartz and samples of alluvial gold from various gold-fields are also shown. One specimen of quartz from the "Mother Shipton" Reef, at Temora, contains 258 oz. of gold. Amongst the alluvial specimens the "Maitland Bar" Nugget, containing 313 oz. of fine gold, is conspicuous.

828. BERTRAM, J., Glen Elgin, via Glen Innes.

Auriferous Pyritous Quartz, from Bertram's Mine, Glen Elgin.

This property is situated in the New England District, New South Wales, and consists of two gold leases having a total area of 24 acres. The reef runs right through the leases for a distance of 38 chains, and varies in width from 4 inches to over 2 feet. In one of the tunnels, at a depth from the surface of about 70 feet, a solid body of pyrites has been struck, which yields on assay from 4 to 6 oz. gold per ton. Bulk tests from the quartz veinstone have yielded up to 2¼ oz. per ton of free gold; if the pyrites had been concentrated, probably the yield would have been much higher. The reef runs through a mountain, which rises 600 feet above a permanent river, which could be utilised as a motive power for machinery—as much as 150 feet fall can be gained in a mile. The timber on the property is more than ample for mining purposes. This property has not been sufficiently prospected, but enough work has been done to show that it will be very valuable when more fully developed.

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.—Gold.

829. CALDWELL, John T., Union Chambers, 71, Pitt-street, Sydney.

Block of Auriferous Quartz, showing free gold, from the Chambigne Gold-mining Company's Mine, 20 miles west of Grafton. Assays of similar stone have yielded up to 17 oz. of gold per ton.

830. CROWN OF THE PEAK GOLD-MINING COMPANY (No Liability), 131, Pitt-street, Sydney.

Two tons of Auriferous Lodestuff, from the Crown of the Peak Mine, Peak Hill, about 32 miles from Narromine, Great Western Railway Line.

Mr. Geological Surveyor David states that "The Peak, which is 44 miles from Dubbo, and 66 miles from Molong, is situated in a belt of auriferous country, which has been proved to extend from Parkes to Tomingley, a distance of 40 miles, and lies between the Myall and Ten-mile Ridges Gold-mines. The Peak itself is an isolated hill, rising about 200 ft. above the level of the red soil plains, and is about $1\frac{3}{4}$ miles in length. It is composed of sandy talcose schist, traversed by reefs of two kinds—white quartz reefs, and ferruginous reefs of spongy quartz, with a great deal of oxide of iron. A belt of diorite intrudes the talcose schists to the east and north of the Peak, and between Tomingley and Parkes is a large mass of granite. . . . The ferruginous quartz reefs are evidently oxidised pyritous veins, and from the experience at the Myall Gold-mines it is thought that, within less than 100 ft. below the surface, these reefs will make into massive gold-bearing pyritous veins."

The Company's property consists of 20 acres held under gold lease, and up to the present five different lodes have been discovered on the property, from 1 to 6 feet in thickness and running nearly parallel to one another. The following shafts have been sunk, viz.:—No. 1, 80 ft. deep; No. 2, 100 ft.; No. 3, 105 ft.; No. 4, 220 ft.; No. 5, 105 ft.; No. 6, 105 ft.; No. 7, 35 ft. No. 4 shaft being our main working shaft, levels have been put in at various depths, at 25 ft., 60 ft., 105 ft., 160 ft., and 220 ft., connecting with Nos. 3 and 6 shafts at the 105 ft. level. At this level a change in the character of the ore occurred, viz., from oxidized to pyritous quartz and talcose veinstone with visible pyrites carrying a little free gold. Samples of this stone taken from the 160 ft. level from a width of 4 ft. of solid stone yielded traces only of gold and silver, but at the 220 ft. level at distances of 25 ft., 32 ft., 50 ft., and 70 ft. from the No. 4 shaft, samples assayed by the Mines Department yielded from 7 dwt. to 46 oz. of gold per ton. Since the formation of the Company about twelve months ago, a total of 2,890 tons of stone have been crushed at the Company's battery (consisting of 15 heads with large Arastra pan, having a crushing capacity of 200 tons per week), for a yield of 1,092 oz. gold. (Mint returns.) From assays made in the Department of Mines Laboratory, it is estimated that from 8 to 14 dwt. of gold per ton are lost in the tailings. Continuous practical experiments are being made which, it is hoped, will eventually result in the saving of a large proportion of of the gold which at present, from its extreme fineness, passes away in the tailings and slimes. The Company having a crushing plant of their own, it was considered advisable to crush the good with the bad, which of course makes the average considerably lower than it would have been had the ore been picked.

831. CUNNINGAR TRIBUTE GOLD-MINING COMPANY (Limited), 16, Norwich Chambers, Hunter-street, Sydney.

Auriferous Pyritous Quartz, from the Company's Mine, Cunningar, Harden.

832. DEEP CREEK GOLD-MINING COMPANY, Nambucca River.

Auriferous Arsenical Lodestuff, from Company's Mine, Deep Creek, Nambucca River.

833. **ELEANORA GOLD & ANTIMONY MINING COMPANY; George Smith, Manager, Hillgrove, near Armidale.**

Auriferous Quartz and Sulphide of Antimony, with White Metal, Crude and Granulated Antimony, from the Eleanora Gold and Antimony Mine, Hillgrove.

The quartz veinstone is from a 12 ft. reef at the 400 ft. level. Since the commencement of this mine, 42,000 tons of stone have been crushed. In addition, 2,000 tons of sulphide of antimony and 150 tons of white metal were sent to the London market. The average yield was about 7 dwt., the loss being considerable, owing to the presence of antimony. A new and more profitable process of extraction has, however, been discovered, which is expected to materially increase the average yield of gold.

834. **FRANKS, W. J., 3, Denison Terrace, Ridge-street, Surry Hills, Sydney.**

One ton of Auriferous Lodestuff, from the Adelaide Hill Mine, Cargo, near Orange. From a reef 8 ft. wide, taken at a depth of 12 ft. A bulk test yielded 1 oz. 8 dwt. of gold per ton.

835. **GARIBALDI GOLD-MINING COMPANY (Limited), 19, Post Office Chambers, Pitt-street, Sydney.**

Five tons of Auriferous Antimonial Quartz Veinstone from Garibaldi Mine, Hillgrove.

The mine is situated at Hillgrove, in the New England District, and comprises an area of about 40 acres, held under gold lease.

The workings consist of three shafts sunk on the line of reef. No. 1 (main shaft) has been sunk 200 ft. The shaft is timbered all through, and divided into three compartments for haulage and ladder way. Levels have been put in at the 100 ft., and driven north 125 ft. and south 200 ft., and at the 200-ft. driven north 115 ft. A winze has been sunk between these levels, and an intermediate level opened up and driven north and south. The reef in this shaft varies a good deal in thickness, above the 100-foot level, it is 20 ft. thick, and carries a little gold and antimony in veins or stringers throughout. At the lower levels the reef is more confined, being about 4 ft. thick, and the antimony is found in veins of about 8 to 10 inches thick in the reef.

No. 2 shaft has been sunk 142 ft. Levels opened out at 50 ft., 100 ft., and 142 ft. The reef here varies from 12 in. to 3 ft., and is richer in gold. Some patches have given as high as 5 oz. per ton; the average will be about 1 oz. to 25 dwt.

The shaft is timbered and divided as in No. 1, and is being sunk on the reef, which is almost vertical. Haulage is done from No. 1 shaft, where a powerful engine is erected.

The battery consists of twenty head of stampers, and has adjuncts—two rock breakers, four Frue vanners, ten Berdan pans, four Chillian mills. The latter have been found useless for the class of stone and are abandoned.

It was found impossible to save the gold by ordinary amalgamation, as the antimony sickens the quicksilver and the gold floats away. The company now smelt all antimonial ore in a furnace, and after the antimony is smelted or "sweated" out of the stone it is found more easily treated at the battery. The company have recently erected a retort, a patent of Messrs. Warren & Mansfields, of Melbourne, who maintained they could drive off all the antimony in the shape of an oxide by hot air blast, and collect it in flues, and leave the stone with the gold free, but up to the present it has not been a success. This is the great difficulty the company have to contend with, that they cannot save a fair proportion of the gold known to be in the stone, and crushings show that about 4 or 5 dwt. are saved, and from 9 to 15, and even 20 dwt., are lost in the tailings.

If some process could be discovered to drive off all the antimony, and save it in the shape of an oxide, so that the free gold would be left to amalgamate, the mine would pay good dividends.

The crushings that have taken place by this and the old company amount to 5,203 tons, which gave 1,600 oz. of free gold, and 713 oz. of gold from concentrates, or a total of 2,313 oz. of gold, together with 101 tons of 50 per cent. antimony, worth then about £12 per ton; 89 tons of 71 per cent. antimony (smelted), worth then about £22 per ton; and 11 tons of 96 per cent. antimony (pure oxide), worth then about £41 per ton.

836. GIBRALTAR HILL GOLD-MINING COMPANY, Adelong.

Auriferous Pyritous Quartz, from Gibraltar Hill Gold-mine, Adelong, yielding 2 oz. free gold per ton, with concentrated pyrites, yielding 6 oz. of gold per ton.

837. GOLDEN CLAD GOLD-MINING COMPANY (Limited), Cargo, near Orange; Walter Burrell, Managing Director, 108, Pitt-street, Sydney.

A. 1 ton of Auriferous Pyritous Quartz from No. 1 Reef, Golden Clad Mine, Cargo; thickness of veinstone, about 18 in. A bulk crushing of this stone at the Clyde Smelting and Chlorination Works, Granville (near Sydney), yielded 3 oz. 16 dwt. 9 gr. of gold per ton.

B. 1 ton of Auriferous Pyritous Quartz from No. 2, or "Big Reef"; traced on surface for 1,200 ft. by a width of 15 ft., and proved by sinking to a depth of 50 ft. A crushing of 3½ tons at the above works yielded 1 oz. 6 dwt. 1 gr. of gold per ton. Area of this property about 29 acres.

838. LEONI, KEATING, & Party, Bimbimbi Creek, Mogo District.

Two tons of Auriferous Quartz from Bimbimbi.

Bimbimbi Creek is situated in the South Coast District, about half-way between Bateman's Bay and Moruya—both available shipping ports—the distance from Bateman's Bay being about 14 miles, and from Moruya about 10 miles. The vein is situated on a spur of the Coast Range, and its direction is nearly north and south. The width of the vein varies from 6 in. to 9 ft. in some places, and underlays to the west. The exhibit was taken from the lode at a depth of 45 ft. from the surface. From the same vein, and at the same depth, 60 tons have just been crushed, and 25 tons of mixed rubble from surface. The returns obtained from the amalgam on the plates were as follows:—

60 tons quartz from 45-ft. level, at 1½ oz. = 90 oz.
25 ,, mixed surface rubble ... ... = 5 ,,

Total smelted gold from 85 tons = 95 oz.

The average yield of this stone with proper treatment will be considerably in excess of results obtained, as the following assays of the blanketings, tailings, skimmings, &c., made in the Department of Mines Laboratory will show. The only available crushing plant, and the one in which the above results were obtained, is old and of the rudest description, the loss therefore being very heavy:—

		Gold per ton.
Official No. 2,528	—No. 1 tailings from the pit	... 1 oz. 9 dwt. 14 gr.
,, ,, 2,529	— ,, 2 ,, amalgamating barrel	... 1 ,, 2 ,, 15 ,,
,, ,, 2,530	— ,, 3 ,, blanketings	...12 ,, 9 ,, 3 ,,
,, ,, 2,531	— ,, 4 ,, skimmings from wells and tables	.38 ,, 14 ,, 9 ,,

839. MAJOR'S CREEK GOLD-MINING COMPANY, Norwich Chambers, Hunter-street, Sydney.

Auriferous Pyritous Quartz, estimated to yield from 1 oz. to 5 oz. of gold per ton.

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.—Gold.

840. MINISTER FOR MINES & AGRICULTURE, Sydney.

Samples of Alluvial Gold from the undermentioned Gold-fields of New South Wales. Assayed at the Royal Mint, Sydney:—

No. of Specimen.	Locality.	Specific gravity.	Loss per cent. in melting.	Assay Report.		Gross value per oz.
				Gold in 10,000 parts.	Silver in 1,000 parts.	£ s. d.
1	Tenterfield	15·89	2·733	8305	100	3 13 11
2	Mudgee	16·89	1·713	9370	055	3 18 5
3	Tibooburra	18·33	·423	9735	020	4 2 4
4	Uralla	17·76	1·215	9550	040	4 0 3
5	Tumbarumba	15·98	2·955	9460	045	3 18 1
6	Bathurst	16·78	2·033	8865	080	3 14 0
7	Forbes	15·47	2·647	9215	075	3 16 5
8	Hill End	16·44	2·663	9445	045	3 18 2
9	Sofala	16·71	1·848	9265	070	3 17 5
10	Kiandra...	15·15	3·115	9240	070	3 16 3
11	Nundle	15·00	2·642	9220	070	3 16 5
12	Bingera	14·54	5·137	8995	090	3 12 9
13	Tamworth	15·94	1·716	9355	060	3 18 3
14	Copeland	14·69	3·748	9000	090	3 13 10
15	Nerrigundah	17·75	1·395	9825	010	4 2 4
16	Murrumburrah ...	17·06	1·906	9470	045	3 19 0
17	Glen Innes	17·19	1·535	9435	050	3 19 0
18	Ironbarks	16·29	2·420	9420	055	3 18 3
19	Orange	16·29	2·188	9290	065	3 17 5
20	Windeyer	18·39	·995	9550	040	4 0 5
21	Temora	16·71	2·166	9575	030	3 19 7
22	Rocky River	16·70	1·423	8760	115	3 13 9
23	Adelong...	17·18	1·953	9470	045	3 19 0
24	Tambaroora	17·10	1·522	9335	060	3 18 3
25	Braidwood	16·73	2·330	9455	045	3 18 7
26	Tenterfield	...	...	8520	135	3 10 5
27	Milparinka	...	...	9715	015	3 19 2
28	Tibooburra	...	...	9725	020	4 1 11
29	Nerrigundah	...	...	9830	010	4 2 1
30	Bingera	...	...	8970	095	3 13 7
31	Young	...	...	9605	030	4 0 0
32	Temora	...	...	9580	030	3 18 2
33	Adelong...	...	..	9465	045	3 18 1
34	Mudgee	...	...	9470	045	3 19 6
35	Armidale	...	...	9085	085	3 16 2
36	Tambaroora	...	...	9440	050	3 19 4
37	Ironbarks	...	...	9665	030	3 19 0
38	Kiandra...	...	...	9200	070	3 16 1
39	Sofala	...	...	9270	070	3 17 6
40	Tamworth	...	...	9235	065	3 14 11
41	Barraba...	...	...	9020	090	3 11 9
42	Glen Innes	...	...	9535	040	3 18 7
43	Stony Creek	...	...	9135	080	3 16 8
44	Tumbarumba	...	...	9190	070	3 15 7
45	Bowling Alley Point, Peel River (3 specimens), crystallised gold.					
46	Old Potato Ground, Burrandong, crystallised gold.					
47	Williams' Lease, The Peak, detrital gold.					

841. MINISTER OF MINES & AGRICULTURE, Sydney.

Alluvial and Reef Gold.

The "Maitland Bar" Nugget, Hargraves—Weight, 344·78 oz., containing 313·093 oz. of fine gold, according to specific gravity test; value, £1,236 14s. 1d.

Gold in Ferruginous Quartz, Lucky Hit Find Gold-mine, Apple-tree Flat—Gross weight, 21·48 oz.; specific gravity, 7·11; fine gold, 14·85 oz.; value, £57 10s. 9d.

Nugget of Gold from Wood's Flat, near Cowra—Weight, 42 oz. 17 dwt. 5 gr.; value, £168 5s. 5d.

Gold in Quartz from Mother Shipton Reef, Temora, depth, 90 ft. from surface. This specimen is estimated, by specific gravity test, to contain 258·33 oz. of gold; value, £1,033.

Gold in Quartz from Mother Shipton Reef, Temora; estimated to contain 41·53 oz. of gold; value, £146.

842. MINISTER OF MINES & AGRICULTURE, Sydney.

Collection of Auriferous Veinstones and Lodestuffs from the Gold-fields of New South Wales.

	Description and Locality.
1.	Auriferous pyritous quartz, Adelong.
2.	,, massive quartz, 600 ft. level, Challenger Mine, Adelong.
3.	,, quartz and chlorite, Great Victoria Mine, ,,
4.	,, quartz and chlorite schist, Annett's Reef, ,,
5.	,, pyritous quartz, ,,
6.	,, pyritous quartz, with chlorite, ,,
7.	,, pyritous quartz, ,,
8.	,, quartz with slate (showing free gold), ,,
9.	,, pyritous quartz, with talc, Great Victoria Mine, ,,
10.	,, binary granite, with copper and iron pyrites (showing free gold), 100-feet level, Challenger Mine, Adelong.
11.	,, binary granite, 978-feet level, Great Victoria Mine, Adelong.
12.	,, binary granite, end of south drive, 770-feet level, Great Victoria Mine, Adelong.
13.	,, pyritous granite (width of lode, 25 feet), 225 feet level, Dargue's Reef, Major's Creek, Braidwood.
14.	,, quartz, with cubical pyrites and a little blende, Major's Creek Gold-mine, Braidwood.
15.	,, pyrites and calcite, 220 feet level, United Miners' Reef, Braidwood.
16.	,, quartz, with iron and copper pyrites, 70 feet level, Red Hill, Major's Creek, Braidwood.
17.	,, quartz, Day Dawn Mine, Little River, Braidwood.
18.	,, quartz, with pyrites, zinc blende, and galena, Major's Creek, Braidwood.
19.	,, quartz, Homeward Bound Reef, Little River, Braidwood.
20.	,, sintery quartz, Crimmon's Selection, Bredbo.
21.	,, pyritous quartz in talcose slate, yielding, gold, 5 oz. 19 dwt. 18 gr. per ton; O'Rourke and Co.'s Claim, near Cooma.

22. Auriferous quartz (showing free gold), Cooma district.
23. „ quartz and felspathic lodestuff (showing free gold), Homeward-bound Mine, Yalwal.
24. „ quartz and felspathic lodestuff (showing free gold), Yalwal.
25. „ felspathic lodestuff, Golden Crown Reef, Yalwal.
26. „ pyritous lodestuff, Enterprise Reef, Yalwal.
27. „ felspathic lodestuff, Mount Gahan, Pambula.
28. „ ferruginous honey-combed quartz, Italia Mine, Thurlinjah.
29. „ honey-combed quartz „ „
30. „ pyrites, gold; 3 oz. 5 dwt. 30 gr. per ton; 3 miles south from Wogonga.
31. „ ferruginous lodestuff, Bailey and Miles' Reef, Mount Dromedary.
32. „ quartz, Moruya.
33. „ ferruginous honey-combed quartz, Moruya.
34. „ quartz veins in quartz and felspar porphyry, 60 feet level, Jerusalem Creek, Bongongolong.
35. „ pyritous quartz veins in quartz and felspar porphyry (showing free gold), Jerusalem Creek, Bongongolong.
36. „ fibrous serpentine (showing free gold), Jones' Creek, Gundagai.
37. „ pyritous quartz; gold, 3 oz. 7 dwt. 12 gr. per ton; silver, 12 oz. 19dwt. 2gr.; Macdonald's Claim, Kydra.
38. „ pyritous vitreous quartz, Muttama Reefs.
39. „ pyritous vitreous quartz „
40. „ quartz, with copper pyrites, malachite, and galena, Mother Shipton's Reef, Temora.
41. „ clay slate (showing gold in cleavage planes), Cowabbie, near Narrandera.
42. „ pyritous quartz, with a little galena, Marshal M'Mahon Reef, Murrumburrah.
43. „ quartz, with mispickel; gold, 3 oz. 13 dwt. 16 gr. per ton; Welcome Claim, near Grenfell.
44. „ pyritous quartz; gold, 14 oz. per ton; Britannia Company's Mine, Forbes.
45. „ quartz veins in diorite, Homeward-bound Reef, Currajong, Parkes district.
46. „ quartz and felspathic lodestuff (showing free gold), New Mount Morgan Reefs, Parkes.
47. „ pyritous quartz (with free gold), 150 feet level, Koh-i-noor Reef, Parkes.
48. „ quartz, with a little stibnite, blende, and chalcopyrites; gold, 11 oz. 8 dwt. 16 gr. per ton; Day Spring Mine, Parkes.
49. „ quartz, Young Australia Reef, Parkes.
50. „ quartz; gold, 16 dwt. per ton; depth, 140 feet; Tomingley.
51. „ ferruginous quartz (showing free gold), Proprietary Mine, Peak Hill.
52. „ ferruginous quartz and calcite, showing stalactitic oxide of iron, with iridescent tints, 30 feet level, Proprietary Mine, Peak Hill.

53. Auriferous ferruginous spongy quartz (with free gold), 30 feet level, Proprietary Mine, Peak Hill.
54. ,, quartz, Gorman's lease ,,
55. ,, ferruginous lodestuff, with carbonate of copper and lead; 40 feet level; near Molong.
56. ,, ferruginous felspathic lodestuff, near Molong.
57. ,, ferruginous felspathic lodestuff, Canoblas, near Orange.
58. ,, calcite, with mispickel and stibnite; 300 feet level; New Reform Gold-mine, Lucknow.
59. ,, calcite, with mispickel and stibnite; 300 feet level; New Reform Gold-mine, Lucknow.
60. ,, ferruginous quartz, Confidence Gold-mine, King's Plain, near Blayney.
61. ,, chalcedonic quartz, and garnet rock (showing free gold), Brown's Creek, near Blayney.
62. ,, chalcedonic quartz, stained with carbonate of copper, Brown's Creek, near Blayney.
63. ,, chalcedonic quartz and garnet rock, stained with carbonate of copper, Brown's Creek, near Blayney.
64. ,, magnetic iron and copper pyrites; gold, 3 dwt., and silver, 16 dwt. per ton; Brown's Creek, near Blayney.
65. ,, chalcedonic quartz, stained with carbonate of copper, showing free gold, Brown's Creek, near Blayney.
66. ,, ferruginous quartz, Last Chance Gold-mine, King's Plains, near Blayney.
67. ,, ferruginous quartz; gold, 1½ oz. per ton; Blayney.
68. ,, ferruginous spongy quartz, Carcoar.
69. ,, felspathic lodestuff, with mispickel, 20 feet level, whip shaft (close to dyke), Junction Reef, Mandurama.
70. ,, felspathic lodestuff, with oxidised pyrites, 20 feet level, whip shaft (close to dyke), Junction Reef, Mandurama.
71. ,, pyritous vitreous quartz, Homeward Bound Gold-mine, Galley Swamp.
72. ,, pyritous quartz, Mount Macdonald.
73. ,, thin quartz veins, in schist; gold, 13 dwt. per ton; Polar Star Gold-mine, Cowra.
74. ,, spongy quartz; gold, 19 dwt. per ton; Polar Star Gold-mine, Cowra.
75. ,, quartz, with a little pyrites in talcose slate, Trunkey Gold-mine, Trunkey.
76. ,, ferruginous quartz; gold, 1 oz. 4 dwt. per ton; Mount Gray, between Trunkey and Tuena.
77. ,, quartz, Sofala district.
78. ,, quartz (with free gold showing); gold, 15½ oz. per ton; 7 miles from Wattle Flat, Sofala district.
79. ,, quartz, Solitary Reef, Wattle Flat, Sofala district.
80. ,, ferruginous quartz; gold, 1 oz. per ton; Mitchell's Creek.
81. ,, quartz, with a little pyrites and blende, 6 ft. from surface, Butler's Reef, 16 miles from Bathurst.
82. ,, quartz, Clear Creek, 5 miles north from Mitchell.
83. ,, quartz, with mispickel, Mount Grosvenor, near Bathurst.

84. Auriferous quartz, and felspathic veinstone, rich in gold, Hill End district.
85. „ quartz, with stibnite, Razorback Mine, Ilford.
86. „ quartz, Cudgegong.
87. „ quartz veins in felsite, Salvation Hill, Gulgong.
88. „ ferruginous lodestuff, Big Reef, Golden Clad Mine, Cargo.
89. „ quartz, pyrites, and blende, Iron Clad Reef, Cargo.
91. „ quartz, with malachite, and chessylite, 195 feet level, Chesney Mine, Cobar.
92. „ quartz, with pyrites, Mitchell's Creek Gold-mine, Wellington district.
93. „ ferruginous quartz and slate, 100 feet level, Occidental Mine, Cobar.
94. „ quartz (showing gold freely), 100 feet level, Occidental Mine, Cobar.
95. „ felspathic lodestuff (showing free gold), Delaney's Dyke Gold-mine, near Molong.
96. „ clay slate (showing free gold), Mount Dromedary.
97. „ pyritous quartz; fine gold, 2 oz. 19 gr. per ton; 40 feet level, Albury.
98. „ pyritous veinstone, 30 feet level, Bungowanna, Albury district.
99. „ ferruginous quartz, near Germanton.
100. „ quartz, Elliston, Upper Hunter.
101. „ quartz, Scone district.
102. „ banded quartz, 138 feet level, Black Prince Mine.
103. „ „ „ „
104. „ banded quartz, 90 feet level, „
105. „ ferruginous quartz; gold, 8 oz. per ton; 5 miles from Tamworth.
106. „ ferruginous quartz, Mount Ephraim, Hanging Rock, Nundle.
107. „ quartz and chlorite schist; gold, 13 dwt. per ton; near Walcha.
108. „ quartz and chlorite schist, Walcha.
109. „ quartz, Bungendore.
110. „ quartz, Herbert Park, near Armidale.
111. „ quartz; gold, 1 oz. per ton; Herbert Park, near Armidale.
112. „ quartz and stibnite (showing free gold), Sunlight Mine, Hillgrove.
113. „ quartz and slate breccia, Sunlight Mine, Hillgrove.
114. „ „ „ „
115. „ quartz and stibnite, Lady Carrington Mine, Hillgrove.
116. „ spongy quartz (showing free gold), Lady Carrington Mine, Hillgrove.
117. „ quartz, with stibnite, Cosmopolitan Mine, Hillgrove.
118. „ stibnite and quartz, Garibaldi Mine, Hillgrove.
119. „ stibnite, with a little quartz, Garibaldi Mine, Hillgrove.
120. „ quartz and slate with stibnite (showing free gold), Eleanora Mine, Hillgrove.

121. Auriferous stibnite, with a little quartz and slate (showing free gold), Eleanora Mine, Hillgrove.
122. ,, stibnite, Eleanora Mine, Hillgrove.
123. ,, breeciated quartz (showing gold freely); gold, 5 oz. per ton; Baker's Creek, Hillgrove.
124. ,, quartz; gold, 1 oz. per ton; Kookabookra.
125. ,, ferruginous felspathic lodestuff, Prospector's Claim, Drake, New England.
126. ,, ferruginous felspathic lodestuff, with copper and iron pyrites, Adelene Mine, Drake, New England.
127. ,, ferruginous quartz, with copper pyrites, Adelene Mine, Drake, New England.
128. ,, semi-crystalline quartz with iron pyrites, Adelene Mine, Drake, New England.
129. ,, quartz, with zinc blende, galena, and carbonate and sulphide of copper, Dillon's Mine, Drake, New England.
130. ,, ferruginous felspathic lodestuff, Mount Gladstone, Drake, New England.
131. ,, ferruginous quartz, 20 feet level, Red Rock, Drake, New England.
132. ,, zinc blende and copper pyrites, 20 feet level, Red Rock, Drake, New England.
133. ,, pyritous quartz, Kelly's lode, Drake, New England.
134. ,, ,, ,, ,, ,,
135. ,, quartz and zinc blende, Yellow Creek, Drake, New England.
136. ,, pyritous quartz with zinc blende, Yellow Creek, Drake, New England.
137. ,, ferruginous quartz, Bourke's Claim, Mount Carrington, Drake, New England.
138. ,, ferruginous felspathic rock, with zinc blende and blue and green carbonate of copper, Fogwell and Party's claim, Mount Carrington, Drake, New England.
139. ,, pyritous quartz and felspathic lodestuff, Hill and McPhee's claim, Yellow Creek, Drake, New England.
140. ,, siliceous felspathic pyritous breccia, Wann's lode, Drake New England.
141. ,, pyritous felspathic lodestuff, Bessant's claim, Drake, New England.
142. ,, quartz, with zinc blende and copper pyrites; gold, 5 oz. per ton; 50 ft. shaft, near Drake, New England.
143. ,,
144. ,, quartz, with stibnite; gold, 1 oz. per ton; Lunatic, near Solferino, New England.
145. ,, crystalline quartz veins, with metallic arsenic, Golden Crown Reef, Solferino, New England.
146. ,, quartz and zinc blende, Golden Crown Reef, Solferino, New England.
147. ,, quartz, with stibnite; gold, ¾ oz. per ton; near Grafton.

148. Auriferous ferruginous quartz, Magpie Claim, 5 miles north from Dalmorton.
149. „ ferruginous quartz, 1½ oz. of gold per ton, Dalmorton.
150. „ ferruginous quartz, 14½ oz. of gold per ton, Mountain Maid Reef, Dalmorton.
151. „
152. „ granite, gold, 1 oz. per ton, Poverty Point, Timbarra.
153. „ felspathic lodestuff, Buchman's Mine, Deep Creek, Nambucca.
154. „ mispickel, 150 ft. level, Nambucca.
155. „ quartz; gold, 1 oz. 3 dwt. 22 gr. per ton, Mountain Maid Reef, Coolongolook.
156. „ vesicular basalt, Black Rock, Ballina.
157. „ amygdaloidal basalt, „ „
158. „ ferruginous quartz, stained with carbonate of copper, McGrath's claim, Barrier Range.
159. „ quartz, and copper ore, Princess Midas Mine, Purnamoota, Barrier Range.

843. MINISTER FOR MINES & AGRICULTURE, Sydney.

Collection of Block Specimens—gold-bearing.

1. Auriferous pyritous quartz, Hodge's Reef, Donkey Hill, Adelong.
2. „ pyritous quartz (from 200-ft. level), estimated to yield 1 oz. 15 dwt. of fine gold per ton; Perseverance Gold-mine, Adelong.
3. „ quartz (showing free gold), Kurrajong Gold-mine, Adelong.
4. „ pyritous quartz, Kurrajong Gold-mine, Adelong.
5. „ „ „ Cunningar Gold-mine, Harden.
6. „ lodestuff, Delaney's Dyke Gold-mine, near Molong.
7. „ pyritous quartz, Snob's Reef, Braidwood.
8. „ „ „ Major's Creek Gold-mine, Braidwood.
9. „ quartz (showing gold freely), Homeward Bound Mine, Yalwal.
10. „ quartz and calcite, Razorback Gold-mine, near Illford.
11. „ lodestuff, Mount Gahan, Pambula.
12. „ ferruginous quartz, Peak Hill.
13. „ lodestuff, Chesney's Mine, near Cobar.
14. „ pyritous quartz, Redfern Gold-mine, near Ironbarks.
15. „ „ „ Mitchell's Creek Gold-mine, Wellington.
16. „ quartz, Edwards and Party's Mine, Locksley.
17. „ „ near Bingera.
18. „ „ (showing free gold), Baker's Creek Gold-mine, Hillgrove.
19. „ quartz, with stibnite, Garibaldi Gold-mine, Hillgrove.
20. „ stibnite (average yield about 1 oz. of fine gold per ton); Eleanora Gold and Antimony Mine, Hillgrove.
21. „ stibnite (average yield about 1 oz. of fine gold per ton); Eleanora Gold and Antimony Mine, Hillgrove.
22. „ quartz, Herbert Park Gold-mine, near Armidale.
23. „ mispickel, Nambucca Heads Gold Mining Co.

24. Auriferous quartz (showing free gold), Chambigne Gold-mine, near Grafton.
25. ,, and argentiferous pyritous porphyry (yielding up to 10 oz. gold and 27 oz. silver per ton); Saw-pit Gully, Fairfield, New England.
26. ,, quartz, Italia Mine, Thurlingah.

844. Bulk exhibit of pyritous quartz from 100 ft. level, T. Wiles and Party's Claim, Adelong; estimated to yield 6 oz. of fine gold per ton.

845. ,, pyritous quartz from 200 ft. level, from the Perseverance Gold-mining Company's Prowse and Woodward's Mine, Adelong; estimated to yield 1 oz. 15 dwt. of fine gold per ton.

846. ,, pyritous quartz from Phillips and Party's Gap Claim, Adelong.

847. ,, pyritous quartz from 120 ft. level, Barber and Party's Claim, Donkey Hill, Adelong; estimated to yield 3 oz. of fine gold per ton.

848. Auriferous quartz from Hodge's Reef, Donkey Hill, Adelong.

849. Gold-bearing pyritous quartz, from the Kurrajong Gold-mine, Adelong Reef; averaging 6 ft. wide.

850. Auriferous pyritous quartz from Snob's Reef, Braidwood.

851. ,, quartz from the Homeward Bound Gold-mine, Yalwal, Shoalhaven, showing gold freely.

This mine is principally worked by quarrying. It has been opened out to a depth of 60 ft. by a width of over 60 ft.; but the extent of the lode has not yet been defined. The lodestuff—quartzite, with thin veins of quartz—yields an average of about 1 oz. of gold per ton.

852. Quartz lodestuff, showing gold freely, from Baker's Creek Gold-mine, Hillgrove, near Armidale.

During the half-year ending 30th June, 1889, 1,307 tons of stone were crushed from this mine, returning 17,293 oz. of gold, or an average of 13 oz. 4 dwt 15 gr. per ton.

853. Auriferous antimony ore and quartz veinstone from the Eleanora Gold and Antimony Company's Mine, Hillgrove, near Armidale; average yield, about 1 oz. of fine gold per ton.

The quartz veinstone is from a 12-foot reef at the 400-foot level. Since the commencement of this mine 42,000 tons of stone have been crushed. In addition, 2,000 tons of sulphide of antimony and 150 tons of white metal was sent to the London market. The average yield was about 7 dwt., the loss being considerable, owing to the presence of antimony. A new and more profitable process of extraction has, however, been discovered, which is expected to materially increase the average yield of gold.

854. Auriferous lodestuff, yielding 3 oz. of gold per ton, from the Great Red Rock Gold and Silver Mining Company's Mine, about 8 miles north-west from Fairfield, New England.

The Company obtain their stone from an open cut or quarry in the mountain. It averages from 10 to 15 dwt. of gold per ton.

855. Auriferous quartz and felspathic lodestuff, with blue and green carbonates of copper, from Sawpit Gully, Fairfield, New England.

856. Ferruginous quartz from Mount Carrington, Fairfield, yielding 2 oz. of gold per ton.

857. Auriferous granite from Big Hill, Timbarra.
" granite from Surface Hill, Timbarra.
" granite from 1st Claim, Timbarra.

858. Auriferous lodestuff, from Delaney's Dyke Gold-mining Company's Mine, near Molong.

This lode consists of brown iron ore on the foot-wall side, passing towards the hanging wall side into siliceous clinker, or chalcedonic quartz and contorted shale. It contains also garnet rock, and is stained with carbonates of copper. The gold occurs also in the garnet rock.

859. Auriferous lodestuff from Chesney's Lease, near Cobar.

This property consists of 25 acres held under gold-mining lease, 50 acres held as a water-right, and 100 acres of freehold land. Two tons of this lodestuff from a 3 ft. at a depth of 3 ft., yielded at the Sydney Mint 4½ oz. of gold per ton, of a value of over £4 per oz. Fourteen tons yielded in Victoria by ordinary treatment 1 oz. 17 dwt. per ton; 12 tons yielded by chlorination 2 oz. 3 dwt. 15 gr. per ton.

860. Auriferous and argentiferous ore from the Mount Billagoe Prospecting Syndicate's Mine, from 95 ft. level.

One and a half tons of this stone yielded, at the Ballarat School of Mines, at the rate of 5 oz. 19 dwt. 5 gr. of gold, and 76 oz. 1 dwt. 23 gr. of silver per ton.

861. Auriferous lodestuff from Mount Gray Gold-mine, Grove Creek, near Abercrombie Caves, about 27 miles from the Newbridge Railway Station, Great Western Railway.

The outcrop of this lode in one place reaches a width of 230 ft. Nine average samples yielded on assay from 13 dwt. 1 gr. to 6 oz. 10 dwt. of gold per ton.

862. Auriferous lodestuff from Brown's Creek Mine, 6 miles west from Blayney.

This deposit is a very remarkable one; it consists of a ferruginous breccia, containing siliceous accretions, or "clinkers," and fills a huge fissure, which is in places 150 ft. wide, in diorite. It was formerly worked by a large open excavation about 250 yds. in length, but the ore is now raised from a shaft. The average yield is about 3 dwt. of gold per ton.

863. Auriferous copper ore from Gordon Mine, Yeoval, from a pit or quarry 150 ft. deep, and about 76 ft. in diameter, the whole body of stone yielding from about 5 dwt. to 10 dwt. of gold per ton.

864. Auriferous quartz from Thomas Edwards and Party's Claim, near Loeksley.

865. Auriferous quartz and calcite, containing from 3 oz. to 6 oz. of gold per ton, with a small percentage of antimony. From the Razorback Gold and Antimony Mine; distance, 18 miles from Capertee Railway Station.

In consequence of the presence of antimony in this quartz it cannot be treated in the ordinary way by quicksilver amalgamation, and has to be shipped for treatment to

Europe, where it is successfully done, but entailing a very large outlay for freight and expenses, which could be saved if the quartz could be treated at the mine. The poorer quartz, of which large quantities could be raised, machinery is being erected to concentrate, and the concentrations can then be shipped to Europe for treatment and extraction, the same as has been hitherto done only with the picked ore. There are ten shafts of more or less depth on the mines—the deepest 162 feet. The reef is well defined, and varies in width from 1 ft. 6 in. to 3 ft. 6 in. The mine is distant from Sydney 146 miles.

866. MITCHELL'S CREEK FREEHOLD GOLD ESTATE, Cope's Chambers, Bond-street, Sydney (Davies, Dalveen, Dick, and Findlay, Owners).

(*a*) About 1 ton of Auriferous Pyritous Quartz from a reef about 2¼ ft. in thickness in the Mitchell's Creek Freehold Estate, District of Wellington, New South Wales; taken from a depth of about 400 ft.

The reef has been worked to an average depth of 150 ft. for about 3,000 ft. in length. The quartz contains about 16 dwt. of free gold per ton, and from 6 to 10 per cent. of pyrites, which yield about 13 oz. of fine gold and 10 oz. of silver per ton.

The property comprises about 600 acres of freehold land, and is worked by a co-partnery of four (above-named) who have recently equipped it with a large concentrating plant for the winning of the pyrites from the old tailings, as well as from the freshly cut quartz now being raised and reduced by a 15-head stamper battery with auxiliary stone-breakers.

(*b*) Auriferous Concentrated Pyrites; being a fair sample of the "concentrates" obtained in the veinstone in the above property.

The process adopted is to lead the crushed tailings from a 15-head stamper battery in wooden races into two pulverising mills, and after regrinding therein, they pass over six Frue Vanner concentrating tables, which accomplish the collection of the pyrites as here exhibited.

The concentrated pyrites yield from 13 to 14 oz. of fine gold per ton, and about 10 oz. of silver.

At present the pyrites, as shown, are shipped for further treatment. The production will average about 30 tons of pyrites monthly of the above value.

867. MOUNT GAHAN GOLD-MINING COMPANY (No Liability), Pambula.

Two tons of Auriferous Pyritous Lodestuff from below the 100 feet level, Mount Gahan Gold-mine, Pambula, estimated to yield about 5 oz. of gold per ton.

The following particulars have been supplied by Mr. William Geo. Collins, Mine Manager:—

"The mine is at the crown of a hill known as Mount Gahan, about 500 feet above sea level, overlooking the ocean at Merimbula, and on the direct line between the Dromedary and Mount Imlay. Its area is 20 acres, and the lease was the first taken up in the district.

"The history of the mine is almost unique. It has paid all expenses from the start, together with seven dividends, amounting to £7,200, and purchase, and erection of extensive machinery. 10,000 tons of ore are now in sight, worth on the average 15 dwt. of gold per ton, and probably as much more with half that amount of gold—sufficient, with the tailings from former crushings, to continue the payment of dividends on the same scale as heretofore for at least two years. Prospecting, which has just been systematically started, is confidently expected to prove extensions of the lode, which will add many more years to the life of the mine.

"The occurrence of the gold is unlike anything hitherto discovered in any of the colonies The lodes are in the main conglomerates and felsitic breccias, in many instances only to

distinguished from the country by irregular walls. The gold is extremely fine and difficult to follow, frequently there is nothing to distinguish the gold-bearing from the barren stone; the drillings and the mortar are the only sure guides. The lodes cross the country in all directions between 25° E. of N. and 25° W. of N., and, so far as my observation goes, the shoots of gold occur at their intersection. Our main lode strikes N. 11° E., and underlies first 66° for 88 ft., then 62° for 61 ft., then 37½° for 57 ft., and finally 60° to present bottom at 312 ft. The lode proper, averaging 6 ft. in width, has been stoped out to the 100-ft. level, but cross-cuts at intervals show 6 ft. in the hanging wall, and 16 ft. in the foot wall of 15 dwt. stone, with low grade ore inside both. It is calculated that the gold-bearing rock (payable) will exceed 40 ft. in width from side to side of the hill, and it is intended to work out the whole by an open cutting from the surface. 3,024 tons of ore crushed yielded 4,487 oz. of gold, with 2,046 oz. estimated to be left in the tailings. This will be recovered as all the tailings are paddocked for treatment. There are 1,600 tons of second class ore in the paddock awaiting treatment when the battery is completed.

"The machinery now in course of erection will comprise stone breaker, ore feeders, 20-head battery, Denny and Roberts' Pans, Molloy's Hydrogen Amalgamators, and Frue Vanners, with Howell's Pans in addition for the tailings resulting from former crushings and for concentrates. An ærial self-acting tramway will convey the ore from the mine to the battery.

"Work in the mine, other than prospecting, is suspended pending the erection of the reducing machinery. All lodes likely to traverse the Company's property are being picked up and surveyed, with a view to discover their points of intersection. Each of these will be prospected. A start has been made on two of them with encouraging results."

868. PEAK HILL PROPRIETARY GOLD-MINING COMPANY (No Liability), Peak Hill, near Dubbo. Office, Victoria Chambers, Castlereagh-street, Sydney.

Auriferous Lodestuff from Peak Hill.

The newly discovered Peak Gold-field lies between the old diggings of Parkes and Tomingley, and in the same belt of auriferous formations which extends in a northerly direction from Parkes to Tomingley, These formations consist of altered silurian schists intruded by dykes of diorite, and traversed by gold-bearing quartz reefs. The adjacent surface soil and alluvial deposits have been more or less worked by miners, and have yielded the fine and coarse gold which has evidently been derived by denudation from these reefs. Mr. T. W. E. David, F.G.S., Geological Surveyor; Mr. Stonier, Assistant Geological Surveyor; Mr. W. H. J. Slee, F.G.S., Inspector of Mines; and Mr. F. Pitman, Chief Mining Surveyor, have inspected this field (see Annual Report, Department of Mines, 1889). Mr. David states that the reefs are of two kinds: (*a*) Reefs of white quartz, with little or no iron; and (*b*) reefs largely composed of oxides of iron—quartz, however, still predominating, and enclosing portions of the country rock much silicified and mineralised. Only a little gold has as yet been detected in the white reefs; but rich samples have been obtained from the ferruginous reefs, or "ironstone reefs," as they are sometimes called. The latter, as a rule, are not bounded by well-defined walls, but merge gradually into the country rock. The fact, however, of these reefs occupying the summit of the hill is strong evidence in favour of the strength of them. It is evident that they are the oxidized caps of pyritous gold-bearing quartz veins, and it is probable that within 100 feet from the surface they will make into such pyritous reefs. Their association with intrusive masses of diorite leads to the supposition that they will continue to be gold-bearing to considerable depths.

The lode from which the samples exhibited were taken has been sunk on to a depth of nearly 400 feet, the average width being over 4 feet. The pyritous ore came in at about 250 feet.

The main shaft is sunk in a large ironstone formation (over 30 feet wide in places, with shoots of gold-bearing stone running through it), to a depth of 400 feet.

Other reefs, carrying more or less gold, have been opened up.

Up to the present some 7,200 tons of ore have been crushed, yielding 3,928 oz. of free gold, worth nearly £4 per oz.

160 tons of pyritous ore from the lower levels, recently crushed, yielded about 9 dwt. per ton, and leaving 30 tons of concentrates, assaying 1 oz. 12 dwt. per ton.

SILVER AND LEAD.

Various lodes have been found in various parts of New South Wales. Previous to the year 1884 the mines at Boorook were the principal ones worked. The value of the silver produced in the Colony during 1883 amounted to £18,563; but in 1884 the argentiferous lead lodes of the Silverton district, in the Barrier Ranges, near the western boundary of the Colony, were opened; and from them, during 1885, silver and silver-lead ore to the value of £108,281 was exported. Since May, 1886, to May 31st, 1892, 36,512,445 oz. of fine silver have been obtained from the Broken Hill Proprietary Silver-mine in this district. During 1885 the quantity of ore furnaced at the Sunny Corner Mine, in the Bathurst district, was 24,547 tons, producing 634,016 oz. of silver and 6,413 oz. of gold. Several lodes, containing rich silver ore, chiefly *fahlerz*, associated with galena and blende, occur in the Vegetable Creek district; other lodes occur near Orange, Captain's Flat, Castle Rag, and Goulburn, &c. The value of the silver, silver-lead, and silver-lead ore produced in New South Wales up to 31st December, 1891, amounted to £11,302,095.

869. BINGHI SILVER AND LEADMI NING COMPANY, 134, Pitt-street, Sydney.

Silver Ore from the Binghi Silver-mine, situated about 23 miles from Torrington, New England Table-land.

The following is the result of an assay of an average sample selected from the ore exhibited :—

Galena, zinc blende, mispickel, stibnite, and a little cervantite, yielding:

Silver, 28 oz. 17 dwt. 2 gr. per ton.
Lead, 14·93 per cent.
Antimony, 11·24 per cent.
Gold, nil.

The main shaft on the main load has been sunk to a depth of 52 feet, and a level 35 feet long driven S. 5° E. from a point in the shaft 30 feet from the surface.

The lode occurs in granite; its thickness in the shaft varies from 2½ to 4 feet.

870. BRITISH BROKEN HILL PROPRIETARY SILVER-MINING COMPANY (Limited). Offices, Abchurch Chambers, Abchurch Yard, London, E.C.,; 39, Queen-street, Melbourne, Victoria, Australia.

Silver-lead Ores from the British Broken Hill Mine, Barrier Ranges, New South Wales, Australia.

Carbonate ores, being three different grades or qualities showing the present smelting ores of this mine, representing a bulk of upwards of 60,000 tons in sight, assaying from 30 per cent. lead and 20 oz. silver per ton to 65 per cent. lead and 5 oz. silver per ton.

Sulphide ores, "firsts," being a representative sample of the ordinary sulphides of this mine, over 1,000,000 tons in sight now; average assay about 25 per cent. lead, 23 per cent. zinc, and 12 oz. silver per ton.

Sulphide ore, "seconds," being a representative sample of the siliceous sulphides of this mine, over 500,000 tons now in sight; average assay about 20 per cent. lead, 23 per cent. zinc, and 10 oz. silver per ton.

871. BROKEN HILL PROPRIETARY BLOCK 10 SILVER-MINING COMPANY (Limited), 15, Queen-street, Melbourne.

Silver-lead Ores.

From December 22nd, 1890, to March 31st, 1892, this mine paid in dividends £360,000. At the last date mentioned the deepest shaft in this mine was 615 feet, at which depth a level had been started. During the previous half-year 1,428½ feet of driving and sinking had been accomplished in exploring and developing the lode. During the same period also, 11,000 tons of refractory sulphide ore were raised, daily assays from which gave an average result of 34·88 oz. of silver per ton, 22 per cent. of lead, and 28·86 per cent. of zinc. The total quantity of this ore at surface amounted to 32,000 tons, containing approximately 1,097,600 oz. of silver, and 7,251 tons of lead.

872. BROKEN HILL BLOCK 14 SILVER-MINING COMPANY, Broken Hill; J. Brandon, Secretary, 15, Queen-street, Melbourne.

Silver-lead Ores from the Broken Hill Block 14 Silver-mine, Barrier Range, New South Wales, Australia.

873. BROKEN HILL JUNCTION SILVER-MINING COMPANY, Offices, Queen-street, Melbourne.

Silver-lead Ores from the Company's Broken Hill Junction Mine, Barrier Range, New South Wales.

874. BROKEN HILL PROPRIETARY SILVER-MINING COMPANY (Limited), Office, 31, Queen-street, Melbourne, Victoria.

Silver-lead Ores from the Broken Hill Proprietary Mine, Barrier Range.

The late Mr. C. S. Wilkinson, Government Geologist of New South Wales, visited the Barrier Range silver-field early in 1884, shortly after the rush to the field. Writing of Broken Hill, which at the time had only been prospected to the extent of two shallow shafts, he states as follows :—"About 3 miles to the S.W. is the Broken Hill, so called from the rugged outline of its rocky summit. This hill is the highest point on a narrow ridge which runs N.E. and S.W. for several miles, and forms a conspicuous feature in the district, rising for about 150 feet above the general level of the undulating plain country on each side. The crest of the ridge is formed by the outcropping of a huge lode. The lode varies in width from 10 to 120 feet, and in places rises above the surface in large craggy black masses. It changes in character every few feet, and consists of ferruginous quartzite, quartz, griesen, felspar, porous brown iron ores or gossan, and oxide of manganese (pyrolusite), with patches and veins of crystallised carbonate of lead (cerussite) ; the occasional black colour of the mass is due to the manganese oxide. Two shafts, one 52 feet deep and the other 50 feet and about 30 chains apart, have been sunk into the lode, as well as two smaller shafts between these. . . . Further prospecting will, I am of opinion, prove this to be a valuable argentiferous lead lode. It appears to dip with the strata, about N. 40° W. at 50°, and on the N.W. side sends off several branches. About 10 chains from it there is a large dyke of diorite." Visiting Broken Hill again in 1887, Mr. Wilkinson states :—"It is a true fissure lode, varying from 10 to 160 feet wide, and consists chiefly of porous iron and manganese oxide in places more or less silicious, containing carbonate of lead and chloride of silver, with occasionally carbonates of copper and zinc. "The walls of the lode are well defined, especially the hanging wall, which in two places I measured dips to the N.W. 65°, but the dip varies in places, and has changed to the east, below the 217-ft. level in M'Cullock's shaft. I noticed that

one projection on the hanging wall had been rounded and striated by a faulting or downward sliding movement northerly at an angle of 47°. This is an important feature, showing that, though the lode must necessarily vary in width, it will continue as far as the displacement or sliding movement of the hanging wall has taken place, probably to a great depth. The lode continues northerly with much the same character, narrowing and widening in places through Blocks 14, 15, and 16, and Broken Hill Junction, beyond which it seems to continue in irregular smaller lodes of a more silicious nature, containing argentiferous galena and carbonate of lead and copper, with a little chloride of silver. To the south it passes into quartzite lodes, containing silver, lead, and copper ores, sparingly distributed through the lodestuff."

In April last (1892) Mr. E. F. Pittman, the present Government Geologist, furnished a report, in which he stated his opinion that in its mode of occurrence the Broken Hill lode is analogous to the celebrated *Saddle lodes* of Bendigo, Victoria. He states that the lode occupies a fissure in the anticlinal fold of which Broken Hill is formed, and that at a depth which varies in the different mines along the Hill it divides into two portions or legs, one following the eastern dip, while the other and larger portion dips to the west. Mr. Pittman is of opinion that these legs will be found to thin out as they descend, but that there is a possibility of other saddle lodes being formed more or less vertically under the present one, and in order to test this he recommends that diamond drill bores be put down through the cap of what is locally known as the "intrusion," but which, he states, is merely the cap of an anticline of gneiss rock underneath the lode.

At the time of the last half-yearly report (May 31, 1892), 3,203 men were employed in connection with this mine; of this number 1,686 were employed underground.

Dividends and bonuses, the latter derived from the flotation of offshoot companies, up to the date abovementioned amounted to £6,216,000, equal to £5 3s. 4½d. per 8s. share on 800,000, colonial register, and £2 2s. per 8s. share on 160,000, London register, or £279 10s. per share on the original £20 shares, which were issued as paid up to £9.

The above vast amount has been realised since smelting was commenced in May, 1886.

The smelting plant now consists of fifteen 60 inch by 112 inch water-jacket furnaces. During the half-year the furnaces averaged 49½ tons each per twenty-four hours whilst in blast. The average is lower than that of the previous half-year, owing to scarcity of water necessitating the raising of highly mineralised water.

The lixiviation (leaching) plant was only in operation for thirty-four weeks during the half-year, and then only to a quarter of its capacity. A total of 14,802 tons of concentrated tailings and roasted ore were treated, producing 71,738 oz. of silver, the cost of treating tailings being 6s. 1d. per ton.

Experimental work has been done with the roasting plant, the material being low grade kaolin and dry silicious ores, carrying from 20 to 34 oz. of silver per ton. The extraction varied from 62 to 87 per cent. The best results were obtained when the furnace was treating about 35 tons of ore per day, the extraction reaching from 85 to 87 per cent. The loss in volatilzation was extremely small, the cost of experimental works of crushing, roastiug, and leaching being 21s. 8d. per ton.

At the refinery at Port Pirie the cost of refining silver from the lead bullion amounted to £1 14s. 6·31d. per ton of bullion.

During the year ending 31st May, 1892, the following classes and quantities of ore were treated :—

Lead ore	126,692 tons,	or 51·5	per cent of total.
Silicious iron ore and kaolin...	116,742 ,,	47·0	,, ,,
Iron ore	3,473 ,,	1·5	,, ,,
	246·907		

Consumption of fuel and fluxes :—

Coke	44,452 tons,	or 18·0	per cent. of the ore treated.
Coal	7,057 ,,	2·8	,, ,,
Limestone ...	79,241 ,,	32·0	,, ,,
Ironstone... ...	7,750 ,,	3·1	,, ,,

The cost of smelting amounted to £1 14s. 9d. per ton of ore.

WORKING SUMMARY, showing gross quantities and values of produce, with net cost and net profit per ton of Ore treated, for each half-year to 31st May, 1892.

Half-year ending.	Ore Treated.	Silver produced.	Lead produced.	Net amount received.	Value per ton of Ore treated.	Total expenses, including depreciation.*	Average cost per ton of Ore treated.	Profit per ton of Ore treated.	Disbursement of profits, less balances and stocks in hand.		
									Dividends and Bonus	Depreciation.	Construction.
	tons. cwt. qr. lb.	Oz.	tons. cwt. qr. lb.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£	£ s. d.	£ s. d.
30 Nov., 1885	48 0 0 0	35,605	.....	7,442 12 11	.....	4,644 15 4	. ..	....	.....	.....	2,582 15 11
31 May, 1886.....	1,103 0 0 0	144,604	....	37,053 5 2	.....	24,199 3 8	....	....	.....	.....	18,737 8 8
30 Nov., 1886	10,397 0 2 0	871,665	1,990 17 3 0	157,215 9 0	15 2 5	70,345 10 6	6 15 4	8 7 1	48,000	.....	10,612 9 5
31 May, 1887.....	18,410 16 3 0	835,526	2,836 7 1 0	204,559 0 7	11 2 2	121,921 2 2	6 12 5	4 9 9	80,000	5,060 1 10	19,701 18 2
30 Nov., 1887	28,799 18 0 25	1,267,699	6,511 13 3 11	287,704 15 6	9 19 6	167,503 10 1	5 16 4	4 3 2	96,000	7,945 3 7	35,361 10 6
31 May, 1888.....	39,789 8 3 26	1,633,737	6,773 19 2 15	373,034 16 4	9 7 6	179,799 9 4	4 10 5	4 17 1	152,000	9,876 13 8	49,479 16 10
30 Nov., 1888	54,336 0 2 6	2,290,455	9,885 10 2 23	512,367 1 10	9 8 7	237,968 4 1	4 7 7	5 1 0	192,000	11,788 6 5	37,665 14 7
31 May, 1889.....	68,545 4 2 13	2,677,686	11,417 10 0 12	585,897 12 8	8 11 0	293,172 4 10	4 5 7	4 5 5	240,000	13,475 1 1	54,337 2 6
30 Nov., 1889	88,639 0 0 0	3,325,613	13,659 4 0 15	744,931 1 10	8 8 1	335,575 19 1	3 15 9	4 12 4	368,000	40,617 15 4	42,959 13 2
31 May, 1890.....	103,399 0 0 0	3,855,331	15,399 14 2 27	872,758 1 8	8 8 9	403,480 1 2	3 18 0	4 10 9	464,000	45,594 8 7	44,827 3 11
30 Nov., 1890	103,912 0 0 0	3,872,546	14,938 19 0 22	974,758 13 6	9 7 7	445,492 17 6	4 5 9	5 1 10	528,000	22,809 2 4	46,183 2 7
31 May, 1891.....	138,645 0 0 0	4,918,124	24,222 12 1 9	1,135,569 17 3	8 3 9	544,713 10 8	3 18 7	4 5 2	576,000	22,526 7 5	19,980 15 2
30 Nov., 1891	147,473 0 0 0	5,028,914	17,465 15 1 9	1,165,883 5 2	7 18 1	532,145 14 6	3 12 2	4 5 11	576,000	24,845 9 6	45,718 9 3
31 May, 1892.....	180,852 0 0 0	5,754,940	26,843 10 2 27	1,192,962 13 1	6 11 11	670,179 15 0	3 14 1	2 17 10	576,000	26,678 6 11	43,174 0 8
Totals.....	984,349 9 2 14	36,512,445	151,945 15 3 2	8,252,138 6 6	.....	4,031,141 17 11	....	....	3,896,000	231,216 16 8	471,322 1 4
										Less Depreciation..	231,216 16 8
										Balance Construction, as per Balance Sheet.. .. .. £	240,105 4 8

* Irrespective of London realisation charges.

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291 : Collections of Minerals, Ores, &c.—Silver and Lead.

875. CENTRAL BROKEN HILL SILVER-MINING COMPANY; Offices, Pitt-street, Sydney.

Silver-lead Ores from the Central Broken Hill Mine, Barrier Range, New South Wales.

During the half-year ending December 31st, 1891, 23,389 tons of ore from this mine were treated at the Company's smelters (five in number), which yielded 883,868 oz. of silver per ton, 1,887 tons of lead, and 197 tons of copper. In addition, 514 tons of ore were shipped to Walleroo, which yielded 15,371 oz. of silver.

The average yield per ton of ore being :—

Silver	40·16	oz.
Lead	8·4	per cent.
Copper	·88	,,

The cost of smelting amounted to 60s. 6d. per ton.

1,666 ft. of exploring and developmental work was performed during the half-year, 613 men being employed by the Company. The deepest working level is 400 ft.

876. GREAT JINGERA PROPRIETARY SILVER MINING COMPANY (No Liability), 2 O'Connell-street, Sydney.

Argentiferous and auriferous bismuth ore from the Great Jingera Proprietary Mine, Whipstick, 14 miles west of Pambula. A bulk assay taken from 3½ tons of ore from this mine yielded metallic bismuth 23·34 per cent.; silver, 1,108 ozs.; and gold, 11 dwts. 23 grs. per ton.

877. GREAT NUNTHERUNGIE PROPRIETARY SILVER-MINING COMPANY; W. H. Hickey, Secretary, Nuntherungie.

Silver-Lead Ores, from the Great Nuntherungie Silver-mine, Nuntherungie.

Mr. Geological Surveyor Jaquet, who lately visited this locality, states that the Nuntherungie Silver Field is situated about 65 miles in a north-westerly direction from Wilcannia, and 160 miles in a north-easterly direction from Broken Hill. The silver ore occurs in lodes from 3 feet to 7 feet wide, running through palæozoic slates, which have been intruded by dykes of diorite and quartz felsites. It is only recently that silver has been discovered in this district, and very little work has at present been performed in order to prospect the lodes. On the Nil Desperandum Silver-mining Company's property a lode has been proved to a depth of 100 feet. At this depth it is 6 feet wide, and the ore assays from 40 to 70 oz. of silver per ton and 15 per cent. of lead. Average samples of the ore exhibited yielded on assay 204 oz. of silver and 38½ per cent. of lead per ton.

878. MILLER, D. S. K., 113, Glenmore Road, Paddington, Sydney.

Silver Ores from the Great Boro Silver and Lead Mine, situated about 5 miles south-east of Tarago Railway Station, and 1½ mile from the village of Boro.

This property consists of 60 acres held under mineral lease from the Crown.

The country rock consists of talcose schist, which is in places much decomposed; the lode is formed of a number of argentiferous veins intersecting the schist, and consisting of carbonate of lead with a little carbonate of copper; in cavities lined with crystals of the minerals mentioned, free chloro-bromide of silver has been detected.

Four shafts have been sunk on the lode, which runs right through the property, to depths varying from 60 to 130 ft., assays of average samples selected therefrom yielding from 8 to 25 oz. of silver per ton, and from 5 to 23 per cent. of lead.

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.—Silver and Lead.

879. MINISTER FOR MINES & AGRICULTURE, Sydney.

Collection of Silver Ores from New South Wales.

No.	Description.	Locality.	
A	Native Silver	Australian Broken Hill Consols Mine.	
1	Argentiferous brown ironstone, out-crop of lode	Brodribb's Shaft.	Proprietary Mine, Broken Hill, Barrier Ranges.
2	,, ferro-manganese, ,,	McCullock's Shaft.	
3	,, ,, ,,	,, ,,	
4	,, ,, ,,	,, ,,	
5	,, stalactitic manganese oxide		
6	Chloride of silver in siliceous ironstone and garnets	Rasp's Shaft.	
7	,, in siliceous ironstone and pyromorphite.	,, ,,	
8	,, ,, ,,	,, ,,	
9	,, ,, ,,	,, ,,	
10	,, ,, ,,	,, ,,	
11	Argentiferous massive cerussite		
12	Chloride of silver in ironstone, with cerussite		
13	,, in cerussite		
14	,, ,,		
15	Argentiferous cerussite		
16	,, cerussite, with garnets, and traces of carbonate of copper.		
17	,, crystallised quartz, with cerussite and malachite.		
18	Chloride of silver in massive cerussite	Rasp's Shaft, 212 ft. level.	
19	Argentiferous massive cerussite, with pyromorphite.		
20	,, crystallised cerussite; silver, 45 oz.; lead, 47·13 per cent. per ton.	150 ft. level main workings.	
21	,, siliceous cerussite, with cuprite and garnets.		
22	,, cerussite		
23	Chloride of silver		
24	Argentiferous kaolin ore	McBrydes' Shaft.	
25	,, ,,	Rasp's Shaft.	
26	,, ,,	,, ,,	
27	,, ,,	,, ,,	
28	,, decomposed granite		
29	Chloride of silver in kaolin ore		
30	Argentiferous siliceous garnet rock, with cuprite		
31	,, cuprite, and granular garnet-rock		
32	,, ,, ,,		
33	,, cerussite and copper ore		
34	,, siliceous garnet-rock with malachite		
35	,, sulphide of lead and zinc (below water level).	Rasp's Shaft.	
36	,, stalactitic iron ore	Block 10 Mine.	Broken Hill, Barrier Ranges.
37	,, siliceous gossany ore	,,	
38	,, ,, ironstone	,,	
39	Native silver and chloride of silver in kaolin	,,	
40	Chloride of silver and calamine	,,	
41	Argentiferous saccharoid quartz	,,	
42	,, ,,	,,	
43	,, crystallised quartz	,,	
44	Chloride of silver in kaolin ore	,,	
45	Argentiferous siliceous sulphides of lead and zinc	,,	
46	,, ,, ,,	,,	
47	,, sulphide of lead and zinc	,,	
48	,, garnetiferous sulphides of lead & zinc	,,	
49	,, ,, ,,	,,	

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.—Silver and Lead.

Minister for Mines and Agriculture, Sydney.—Collection of Silver Ores from New South Wales—*continued.*

No.	Description.	Locality.
50	Argentiferous sulphides of lead and zinc	Block 10 Mine.
51	Chloride of silver in siliceous iron-stone	Central Mine.
52	,, and native silver in siliceous iron-stone.	,,
53	Argentiferous spongy gossan, and oxide of iron ...	,,
54	,, massive cerussite	,,
55	,, siliceous cerussite, and carbonate of copper.	,,
56	,, massive ferruginous cerussite	,,
57	,, massive cerussite	,,
58	Chloride of silver in kaolin ore	,,
59	Argentiferous sulphides of lead and zinc	,,
60	,, ,, ,,	,,
61	Chloride of silver in siliceous gossany ore.....	South Mine.
62	Argentiferous ferruginous massive cerussite, with crystals of cuprite.	,,
63	Native silver in siliceous carbonate of lead and copper.	,,
64	Argentiferous massive cerussite	,,
65	Native silver and chloride of silver in ironstone...	,,
66	Argentiferous siliceous garnet ore	,,
67	,, saccharoid quartz, with ehessylite..	,,
68	,, siliceous sulphides of lead and zinc.	,,
69	,, ,, cerussite.....	,,
70	,, sulphides of lead and zinc	,,
71	Chloride of silver in saccharoid quartz, with cerrussite.	Block 14 Mine.
72	Argentiferous cerussite and granular quartz	,, ,,
73	,, massive cerussite	,, ,,
74	,, cerussite..... ...	,, ,,
75	,, cerussite, with carbonate of copper and granular quartz.	,, ,,
76	,, granular quartz and cerussite	British Mine.
77	,, granular siliceous ore, with cerussite	,, ,,
78	,, crystallised cerussite, with oxide of manganese.	,, ,,
79	,, massive cerussite	,, ,,
80	,, cerussite, with cuprite	,, ,,
81	,, cerussite, with cuprite and silicate of copper.	,, ,,
82	,, siliceous cerussite, with cuprite ...	,, ,,
83	,, sulphides of lead and zinc	,, ,,
84	,, ,, ,, ,, ...	,, ,,
85	,, garnetiferous sulphides of lead and zinc.	,, ,,
86	,, garnetiferous sulphides of lead and zinc.	,, ,,
87	,, ferruginous cerrussite, with crystallised calamine.	,, ,,
88	,, ferruginous kaolin ore.....	Junction Mine.
89	Chloride of silver and calamine	,, ,,
90	Argentiferous crystallised cerussite	,, ,,
91	,, garnetiferous cerussite and granular quartz.	,, ,,
92	,, siliceous carbonate of lead and copper.	,, ,,
93	,, garnet sandstone	North Junction Mine.
94	,, ,, ...	,, ,,

Broken Hill, Barrier Range.

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291 : Collections of Minerals, Ores, &c.—Silver and Lead.

Minister for Mines and Agriculture, Sydney.—Collection of Silver Ores from New South Wales—*continued.*

No.	Description.	Locality.	
95	Argentiferous granular siliceous ore with native copper.	North Mine.	Broken Hill, Barrier Range.
96	,, siliceous sulphides of lead and zinc	,,	
97	,, ,, ,,	White Lead, Block 5.	
98	,, galena and siderite	19 ft. level hanging wall, Umberumberka.	
99	,, ,, ,, ...	,, ,,	Barrier Range.
100	Native silver in galena and siderite	,, ,,	
101	,, ,, ,, ...	,, ,,	
102	Argentiferous fine grained laminated galena	Umberumberka.	
103	,, fine grained galena and siderite.....	,,	
104	,, fine grained laminated galena	Gipsy Girl Mine.	
105	,, cerussite and galena.....	,,	
106	,, siliceous cerussite	Alpha Mine, 8 miles north from Broken Hill.	
107	,, quartz and siderite, with galena, blende, iron, and copper pyrites	Introductory Mine, Thackaringa.	
108	,, galena, and cerussite	,, ,,	
109	,, cerussite.....	Sinclair's Mine, 9 miles N.E. from Thackaringa.	
110	,, galena.....	Lode, 2½ ft. thick, Thackaringa.	
111	,, galena, with fluor-spar	Purnamoota.	
112	Chloride and native silver in ferruginous cerussite	Lake's Camp, New Year's Mine.	
113	,, fine grained galena	,, ,,	
114	,, siliceous garnet rock, and galena ..	Minnie Moore Lode, Pinnacles.	
115	,, siliceous garnet rock, with magnetic pyrites and blende.	,, ,,	
116	,, siliceous garnet rock, with galena and blende.	,, ,,	
117	,, galena, blende, and pyrrhotite	Pinnacles.	
118	,, quartz and garnet gangue, with galena and blende	,,	
119	,, iron and copper pyrites	Goat Hill, Thackaringa.	
120	,, cerussite, and galena	,, ,,	
121	,, galena and oxide of iron.....	,, ,,	
122	,, argillaceous cerussite	,, ,,	
123	Chloride of silver in ferruginous lodestuff	Model Republic Lode, Silverton.	
124	,, pseudomorphic crystals of brown iron ore.	Hen and Chicken Mine, Lake's Camp.	
125	Chloride of silver in ironstone.....	,, ,,	
126	Argentiferous galena	Thackaringa.	
127	,, ferruginous lodestuff, with carbonate of copper.	Hen and Chicken Mine, Lake's Camp.	
128	Chloride of silver	Christmas Mine, 16 miles N.E. from Silverton.	
129	,, in ferruginous cerussite and a little malachite. Silver, 99 oz. ; lead, 64 per cent. ; gold, 1 dwt. per ton.	Appollyon Mine.	
130	,, in ferruginous schist	,,	
131	,, ,, ...	,,	
132	,, ,, ...	,,	
133	Argentiferous stalactitic iron gossan	Sunny Corner Mine.	Mitchell
134	,, ,, ,, ...	,,	

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.—Silver and Lead.

Minister for Mines and Agriculture, Sydney.—Collection of Silver Ores from New South Wales—*continued.*

No.	Description.	Locality.	
135	Argentiferous gossan	Sunny Corner Mine.	Mitchell.
136	,, ,,	,,	
137	,, sulphides of lead, copper, iron, and zinc.	,,	
138	,, ,, ,,	,,	
139	,, quartz and felsite, with galena and blende.	,,	
140	,, sulphide ore	,,	
141	,, ,,	,,	
142	,, gossan	Nevada Mine.	
143	,, lodestuff and carbonate of copper	,,	
144	,, sulphides of iron, copper, lead, and zinc.	,,	
145	,, gossan	Silver Queen Mine.	
146	,, quartz and felsite, with pyrites	,,	
147	,, galena, blende, and pyrites	Great Western Mine.	
148	,, ,, ,,	,, ,,	
149	,, felsite, with copper and iron pyrites	Nevada Mine.	
150	,, claystone, with galena and pyrites	Tonkin's Lease.	
151	,, claystone, with sulphide of copper, iron, zinc, and lead.	,,	
152	,, gossan	Monte Christo.	
153	,, quartz, with pyrites	,,	
154	Chloride of silver in quartz	,,	
155	Argentiferous ferruginous carbonate of lead and copper.	Wiseman's Creek.	
156	,, quartz, with fahlerz and carbonate of copper.	,,	
157	,, schistose gossan, with cerussite	,,	
158	,, sulphide of copper and zinc in schist	,,	
159	,, gossan, with cerussite	Mount Costigan, near Tuena.	
160	,, sulphides of iron, copper, zinc, and lead.	,, ,,	
161	,, claystone, with pyrites	Boorook, New England	
162	,, gossan	New Lewis Ponds, near Orange.	
163	,, cerussite	,, ,,	
164	,,		
165	Chloride of silver	,, ,,	
166	Argentiferous ferruginous carbonate and phosphate of lead.	Great Southern Silver-mine, Grenfell District, near Grenfell.	
167	,, ,, ,,	,, ,,	
168	,, galena and pyrites	,, ,,	
169	,, ,,	,, ,,	
170	,, ferruginous cerussite	Wallah Wallah Silver-mine, near Burrowa.	
171	,, ,,	,, ,,	
172	,, galena	30 ft. level, ,,	
173	,, ,,	,, ,,	
174	,, galena and blende	60 ft. level, ,,	
175	,, galena and iron pyrites, in quartz and felspathic gangue.	Melrose, Condobolin District.	
176	,, cerussite, in soft claystone	,, ,,	
177	,, ferruginous cerussite, silver 49 oz. per ton.	,, ,,	
178	,, ferruginous gossan	Cookbundoon, South-western District.	

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 230 and 231 : Collections of Minerals, Ores, &c.—Silver and Lead.

Minister for Mines and Agriculture, Sydney.—Collection of Silver Ores from New South Wales—*continued.*

No.	Description.	Locality.	
179	Argentiferous ferruginous cerussite, silver 60 oz. per ton.	Broula, near Cowra.	
180	,, galena and fluor spar	Goodhope, near Yass.	
181	,, galena and cerussite	,, ,,	
182	,, argillaceous cerussite	9 miles from Tarago.	
183	,, galena and zinc blende	Near Bungonia.	
184	,, quartz and felsitic lodestuff	May Day Reef, Black Range, near Albury.	
185	,, quartz and felspathic veins, with galena and blende.	,, ,, ,,	
186	,, quartz veinstone, with galena and pyrites.	24 ft. level, Right Arm Creek, Yalwal.	
187	,, siliceous veinstone. Silver, 70 oz. ; lead, 60 per cent. per ton.	Bredbo.	
188	,, galena and calcite	Quedong, Southern District.	
189	,, galena in quartz veinstone	Mt. Grosvenor, near Bathurst.	
190	,, schistose quartz and felspathic veinstone. Silver, 245 oz.; gold, 2½ oz. per ton.	Back Creek, near Rockley.	
191	,, cerussite, with galena and protoxide of lead.	Mount Trooper, Snowy River.	
192	,, ,, ,, ,, ...	,, ,,	
193	,, ,, ,, ,, ...	,, ,,	
194	,, cerussite and protoxide of lead ...	Captain's Flat, Molonglo.	
195	,, ferruginous claystone. Silver, 214 oz. ; gold, 2½ oz. per ton.	Boorook.	New England.
195A	,, claystone, with pyrites	,,	
196	,, ferruginous quartz	,,	
197	,, elaystone..	Golden Age, Boorook.	
198	,, ferruginous claystone	Silver King, ,,	
199	,, quartz, with a little pyrites. Silver, 275 oz. per ton.	Addison lode, ,,	
200	,, quartz and pyrites. Silver, 164 oz.; gold, 2 oz. per ton.	,, ,,	
201	,, quartz, with a little pyrites. Silver, 275 oz. per ton.	,, ,,	
202	,, claystone, with pyrites	Big Plant Mine, near Emmaville.	
203	,, altered claystone, with galena and blende.	,, ,,	
204	,, galena, fahlerz, and pyrites, in quartz and claystone.	Webb's Silver-mine, near Emmaville.	
205	,, fahlerz, in elaystone	New England Broken Hill.	
206	,, quartz and felspathic veinstone, with galena, blende, and pyrites.	White Rock Mine, Drake.	
207	,, zinc blende, galena, and pyrites, in quartz.	,, ,,	
208	,, ,, ,, ,, ...	,, ,,	
209	,, gossan, with cerussite	Pye's Creek, near Deep-water.	
210	,, gossan.....	,, ,,	
211	,, cerussite and galena.....	,, ,,	
212	,, galena and blende, with quartz.....	,, ,,	
213	,, galena, with copper pyrites and mispickel.	60-ft. level, Homeward Bound Mine, Pye's Creek.	
214	,, siliceous felspathic gangue, with zinc blende and galena.	Pye's Creek, near Deep-water.	

Minister for Mines and Agriculture, Sydney.—Collection of Silver Ores from New South Wales—*continued.*

No.	Description.	Locality.	
215	Argentiferous zinc blende and pyrites	Monte Christo, near Deepwater.	New England.
216	,, galena, with quartz	Webb's Consols Mine, near Emmaville.	
217	,, galena, mispickel, and copper pyrites.	,, ,,	
218	,, galena	,, ,,	
219	,, mispickel and copper pyrites	,, ,,	
220	,, galena and cerussite	Castle Rag Mine, near Deepwater.	
221	,, galena, blende, and a little pyrites.	Clarevaux, near Glen Innes	
222	,, quartz in granite. Silver, 1 oz. 18 dwt. per ton.	Boonoo Boonoo, near Tenterfield.	
223	,, blende, galena, and pyrites, in claystone. Silver, 21 oz. per ton.	,, ,,	
224	,, mispickel, in felspathic gangue	4 miles south-west from Ashford.	
225	,, quartz and felspathic veinstone, with galena and chalcopyrites	35-ft. level, near Deepwater.	
226	,, blende and galena, in quartz gangue	Mascotte Mine, Drake.	
227	,, quartz veinstone	Wollomombi, Armidale district.	
228	Sulphide of silver, in quartz	,, ,,	
229	,, ,, ,,	,, ,,	
230	,, ,, ,, Silver, 386 oz. per ton.	,, ,,	
231	Argentiferous galena and felspathic gangue. Silver, 16¼ oz.; lead, 29 per cent. per ton.		
232	,, zinc blende, galena, and pyrites, in quartz veinstone.	Richmond River.	
233	,, ,, ,, ,,		

880. MINISTER FOR MINES & AGRICULTURE, Sydney.

Collection of Block Specimens of Silver Ores.

No.	Description.	Locality.
1	Argentiferous siliceous iron ore	Proprietary Mine, Broken Hill, Barrier Range.
2	,, cerussite	,, ,, ,,
3	,, kaolin	,, ,, ,,
4	,, sulphides of lead and zinc	,, ,, ,,
5	,, cerussite, with malachite	South Mine, Broken Hill, Barrier Range.
6	,, siliceous sulphides of lead and zinc.	,, ,, ,,
7	,, sulphides of lead and zinc	,, ,, ,,
8	,, ,, ,, ,,	North Mine, Broken Hill, Barrier Range.
9	,, siliceous iron ore	Block 10, Broken Hill, Barrier Range.
10	,, siliceous iron ore, with chloride of silver.	,, ,, ,,
11	,, saccharoid quartz	,, ,, ,,
12	,, sulphides of lead and zinc	,, ,, ,,

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291 : Collections of Minerals, Ores, &c.—Silver and Lead.

Minister for Mines and Agriculture, Sydney.—Collection of Block Specimens of Silver Ores—*continued.*

No.	Description.	Locality.
13	Argentiferous cerussite	Block 14 Mine, Broken Hill, Barrier Range.
14	,, ,,	,, ,, ,,
15	,, sulphides of lead and zinc	,, ,, ,,
16	,, cerussite	British Mine, Broken Hill, Barrier Range.
17	,, sulphides of lead and zinc	,, ,, ,,
18	,, galena and garnet sandstone	Junction Mine, Broken Hill, Barrier Range.
19	,, kaolin, in quartz	,, ,, ,,
20	,, garnet sandstone	North Junction Mine, Broken Hill, Barrier Range.
21	,, galena, with native silver and carbonate of iron.	Umberumberka Mine, Broken Hill, Barrier Range.
22	,, galena	Gypsy Girl Mine, Broken Hill.
23	,, ,,	Christmas Eve Mine, Purnamoota.
24	,, galena and blende	Pinnacles Mine, Purnamoota.
25	,, gossan	Sunny Corner Mine, Mitchell.
26	,, sulphides of lead, iron, copper, and zinc.	,, ,,
27	,, cerussite	New Lewis Ponds Mine, near Orange.
28	,, galena	Wallah Wallah Mine, near Yass.
29	,, quartz, with galena	Melrose.
30	,, galena	Humewood, near Yass.
31	,, iron gossan	One Tree Cordillera Mine, near Tuena.
32	,, galena	Yarrangobilly Mine, Tumut District.
33	,, gossan, with galena	Boorolong.
34	,, galena, mispickel and blende	Webb's Consols Mine, near Emmaville.
35	,, felspathic lodestuff	Gordon Mine, near Emmaville.
36	,, lodestuff, with galena, blende, and pyrites.	White Rock Proprietary Mine, Drake.
37	,, gossan, with galena.	Rivertree, New England.

881. Iron Ore and Limestone used as Flux at the Broken Hill Silver-lead Smelting Works.

No.	Description.	Locality.
1	Ferro-manganese oxide	Outerop, British Broken Hill Silver-mine, Barrier Range.
2	Iron ore	Stephen's Creek, near Broken Hill.
3	Limestone	Three miles east of Broken Hill.
4	,,	Near Balaclava Mine, Broken Hill.
5	,,	Acacia Dam, near Broken Hill.
6	,,	Tarrawingee Flux Quarry, near Broken Hill.
7	,,	Six miles S.E. from Pinnacles, near Broken Hill.

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.—Silver and Lead.

MINISTER FOR MINES & AGRICULTURE, Sydney.

882. Collection of Rock Specimens (schists, gneiss, granite, quartzite, sandstone, limestone, diorite, &c.), illustrative of the stratigraphy of the Barrier Range Silver Field.

883. Silver-lead Ores from the Proprietary Silver-mine, Barrier Range.

884. Collection of Silver Ores from the Broken Hill Block 14 Silver-mine, Barrier Range.

885. Silver Ores from the Central Broken Hill Silver-mine, Barrier Range.

886. Silver-lead Ores from Broken Hill Junction-mine, Barrier Range.

887. Silver Ore from the Broken Hill North Silver-mine, Barrier Range.

888. Silver Ore from the Gipsy Girl Silver-mining Company's Mine, Barrier Range.

This ore—consisting of massive galena—averages about 40 oz. of silver per ton, and 75 per cent. of lead. The lode varies from 6 inches to 3 feet in thickness, and is accompanied by quartz and ironstone stained with carbonate of copper. It appears on the surface for about 7 chains.

889. From New Year Silver-mining Company's Mine, Lake's Camp, Barrier Range:—
- Silver Ore, showing native silver, and assaying at the rate of 10,500 oz. silver per ton.
- Silver Ore, showing chlorides of silver, assaying 1,260 oz. silver per ton.
- Silver-lead Ore, assaying 72 oz. silver per ton.

890. Silver-lead Ores from Umberumberka, Barrier Range, showing native silver freely.

The lode occurs in mica schists, and dips S. 25° E. at an angle of 75°. It varies in width from 4 to 10 feet, and consists of crumpled mica schist, traversed by veins and lenticular bunches of brown iron ore or gossan, carbonate of lead, and galena. The ore, yielding from 70 to 120 oz. of silver per ton, is chiefly finely crystallised galena distributed in irregular masses. At a short distance to the north of the main lode, another lode has been discovered in the railway cutting.

891. Silver-lead Ores from the Christmas Eve Mine, Purnamoota, Barrier Range.

892. Silver Ores from the Pinnacles Tribute Mine, Barrier Range.

This mine is situated about 15 miles S.E. from Silverton. In one shaft the lode is from 3 ft. 6 in. to 4 ft. wide, dipping W. 30° S. at 70°, in talcose mica schist, and consisting of ferruginous crystalline quartzite, with galena interspersed here and there through it, and patches of yellow gossan. An average sample from the whole width of the lode gave on assay 78 oz. 8 dwt. silver per ton, and 32·40 per cent. lead.

893. Silver-lead Ores from the Terrible Dick Mine, Barrier Range.

Silver Ore (galena), yielding 58 oz. of silver per ton, and 75 per cent. of lead.

894. From Laurium Silver-mining Company's Mine, Thackaringa, Barrier Range.

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.—Silver and Lead.

895. Silver Ore from the Webb's Consol Mine, about 10 miles S.W. of Emmaville, New England.

4 tons 17 cwt. of this ore treated at Footscray, Victoria, yielded 2 tons 18 cwt. 3 qr. 4 lb. of lead, 1 ton of which, on being desilverised, yielded 120 oz. 3 dwt. of silver.

896. Silver Ores from Webb's Silver-mine, Little Plant Creek, near Emmaville.

This ore consists of galena, mispickel, copper pyrites, blende, and fahlerz. The galena has returned silver at the rate of 148 oz. per ton. The following analysis shows the composition of the silver-bearing fahlerz :—

Metallic copper	31·500
,, antimony	18·130
,, zinc	6·140
,, iron	6·440
,, lead	·680
,, silver*	1·635
Sulphur	26·180
Insoluble in acids (silica)	7·200
Traces of arsenic, gold, and undetermined	2·095
	100·000

* Equal to 534 oz. 2 dwt. of fine silver per ton.

897. Five tons of Silver Ore, from the White Rock Proprietary Silver-mine, Fairfield, about 3 miles from Drake.

Representing an enormous body of ore which forms the face of a high cliff, and from which the ore is obtained by quarrying. The face from which this exhibit was obtained is about 90 feet wide, and consists of quartz and felsitic gangue (in parts brecciated), carrying veins and strings of zinc blende, galena, copper, and iron pyrites irregularly distributed through it. The metallic sulphides form about 10 per cent. of the mass, and when concentrated yield up to 200 oz. of silver per ton. This mine offers a good opening for an efficient concentrating plant and also for an economic process for treatment of the concentrates.

Particulars of Ore sent to various Smelting Works and at the Mine, from the commencement to the 23th May, 1888.

Quantity of Ore.	Less Moisture.	Net Weight.	Silver.	Price.	Gross Value.	Sampling and Smelting Charges.	Freight and other Charges.	Net Amount received for Ore.
tons cwt. qr. lb.	cwt. qr. lb.	tons cwt. qr. lb.	oz.	s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
7 17 0 15	1 2 8	7 15 2 7	131	3 4$\frac{4}{12}$	171 2 4	25 5 7	49 8 0	216 8 8
6 5 2 0	1 1 0	6 4 1 0	136	3 3$\frac{1}{5}$	140 3 9	20 3 10		
8 18 1 14	5 1 11	8 13 0 3	120	3 2$\frac{5}{5}$	167 19 5	66 2 5	84 0 0	193 17 4
11 16 1 0	2 1 13	11 13 3 15	94	3 2$\frac{3}{4}$	176 0 4			
1 19 3 0	0 3 5	1 18 3 23	177	3 6$\frac{3}{4}$	31 10 6	5 16 11	7 13 3	18 0 4
36 17 0 1	11 1 9	36 5 2 20	658	....	686 16 4	117 8 9	141 1 3	428 6 4

Particulars of Ore treated from 28th May to 29th October, 1888

Weight.	How disposed of.	Net Value.
tons cwt. qr. lb.		£ s. d.
34 6 2 25	English and Australian Copper Company (Limited)	462 12 0
1 18 3 23	Australian Smelting and Refining Company (Limited), Dry Creek	21 0 0
57 10 0 1	German Works	724 1 7
93 15 2 21		1,207 13 7

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.—Silver and Lead.

898. Quartz and Felspathic Lodestuff, with zinc blende and pyrites, assaying up to 1 oz. of gold and 100 oz. of silver per ton; average width of lode, 12 feet. From Mascotte Gold and Silver Mining Company's Mine, Drake, New England.

899. Galena, with a little copper pyrites and zinc blende, in ferruginous quartz and felspathic lodestuff, yielding 40 oz. of silver per ton, and 40 per cent. of lead. From the Great Red Rock Gold and Silver Mine, Fairfield, New England.

900. Massive Blocks of Felspathic Lodestuff, with galena, zinc blende, and pyrites. From Gordon Silver-mine, Emmaville, New England.

901. Silver Ore, from Rivertree, yielding up to 200 oz. of silver per ton, and 20 per cent. of lead.

902. Silver Ore, from Pye's Creek, yielding up to 100 oz. of silver per ton, and 50 per cent. of lead.

903. Silver Ores from the Vanderbilt and Commodore Silver-mining Company's Mine, now Lake George Silver-mining Company, Captain's Flat, Molonglo.

904. Silver Ore, consisting of massive galena, carbonate of lead, and a little carbonate of copper, from Yarrangobilly Silver-mine, Tumut district.

There are two parallel lodes in this property, one of which has been traced on the surface for about 300 yards, with a width of about 3 feet, assays from which yielded from 20 to 98½ oz. of silver per ton.

The second lode, about 80 yards to the eastward of the first, has been traced on the surface for about 100 yards, with a width of 12 feet at a depth of 30 feet, assays from which yielded up to 20 oz. of silver per ton, and 45 to 80 per cent. of lead.

905. Carbonate of Lead (earthy) from Cullula Lead and Silver-mining Company's Lease, Carragh Creek, 6 miles S.W. of Windellima, county of Argyle.

Assay.

84·11 per cent. Carbonate of lead.
13·92 per cent. Clay.
1·97 per cent. undetermined.

100·00

906. Silver-lead and Copper Ore from the Mount Costigan Lead and Silver Mine.

This property comprises an area of 150 acres. Smelting, in two furnaces, was first commenced on the 26th July, 1887. 4,565 tons of ore were treated, producing 106,084 oz. of fine silver, 659 oz. of fine gold, and 359 tons of lead, of a total value of £26,361. Recently this mine has been reopened and smelting carried on with favourable results.

Average Assays of Ores Exhibited.

Sulphide ore—Silver, 19 oz. 1 dwt. 2 gr. per ton.
Lead, 12·10 per cent.
Copper and lead ore—Copper, 39·30 per cent.
Lead, 16·33 per cent.
Silver, 27 oz. 15 dwt. 4 gr. per ton.

907. Silver, Lead, and Copper Ores, from the Cordillera Hill Silver-mine, Peelwood.

908. Silver Ore from the One-tree Cordillera Hill Silver-mine, near Tuena.

909. Gold and Silver Ore from the New Lewis Ponds Gold and Silver Mine, about 15 miles east of Orange.

The lode consists of gossan, containing chlorides of silver and carbonate of lead, with a fair percentage of gold down to the water-level (150 feet), where sulphide ores are met with.

910. Silver Ores from Sunny Corner Silver-mining Company's Mine, Mitchell.

911. Block of Ore from 40 feet level, No. 2 shaft, Back Creek Silver and Gold Mine; reef 5 feet thick; 36 tons 18 cwt. 1 qr. yielded 3,406 oz. of silver, and gold at the rate of 15 dwt. per ton.

912. Silver, Gold, and Copper-bearing Lodestuff from the Eyrie South Mines, Wiseman's Creek, near Brewongle.

913. Lead Ore from Humewood, near Yass, and metallic lead smelted from the above.

914. MOUNT STEWART LEAD & SILVER-MINING COMPANY (No Liability), Leadville. Office, 15 Hunter-street, Sydney.

Silver lead ores from Mount Stewart Silver Lead Mine.

Smelting operations by means of a water jacket furnace have recently commenced at this mine, and during the half-year ending 30th September, 1892, 7,517 tons of ore were treated, which yielded 146,839 ounces of silver, and 946 tons of lead, being an average of 19·53 oz. of silver per ton, and 12·5 per cent. of lead. The cost of raising and smelting amounted to £2 2s. 11d. per ton of dry ore. The ore treated consisted chiefly of ferruginous carbonate of lead. Three parallel lodes occur on this property, viz., eastern, middle, and western lodes. From the outside wall of the eastern lode to the outside wall of the western lode is about 300 ft.; the eastern lode is from 50 to 100 ft.; the middle from 35 to 40 ft.; and the western lode 35 ft. between walls. The silver-bearing lodestuff occurs as bunches and veins in the lode material. Carbonate ore is extracted from the 157 ft. level in the eastern lode; below this level sulphide ores make their appearance. In the middle lode carbonate ore has been obtained at the 250 ft. level. An abundant supply of limestone flux is obtained from the western lode at the 150 ft. level. A permanent water supply has been obtained by means of iron piping 9,600 ft. long from Coolah Creek.

915. NIL DESPERANDUM SILVER-MINING COMPANY. W. H. Hickey, Secretary, Nuntherungie.

Silver-lead Ores, from the Nil Desperandum Silver-mine, Nuntherungie. (For description of Field see Great Nuntherungie Proprietary Co.'s entry.) An average sample from this exhibit yielded on assay 62½ ozs. of silver per ton, and 8·6 per cent. of lead.

916. PINNACLE AMALGAMATED SILVER-MINING COMPANY (Limited), 70, Queen-street, Melbourne.

Two and a half tons of Silver Ore from the Pinnacle Mine, Barrier Range.

Situation.—The mine is situated about 10 miles south-west of the township at Broken Hill, and 17 miles south-east from Silverton; contains about 340 acres, held under lease from the Department of Mines, in the Colony of New South Wales.

Lodes, of which there are several, consist of a number of segregation veins, running in various directions with the strike of the country gneiss. Two veins are being worked.

The Tribute Lode, and Consols Lode.—The tribute lode runs north-west and south-east, dips south-west, the underlay being 60°. The shaft is 300 feet deep, and the ore vein has been cut at 100, 200, and 300 feet, and levels driven thereon. Average width of lode, 17 feet ; longest level, 350 feet, on to ore in all faces except at 200-foot level south-west. Stopes are 30 feet high over the 200-foot level, and 14 feet over the 100-foot level ; no stoping has been done at the 300-foot level. The consols lode runs north-east and south-west, and underlays south-east 45°. The shaft is 600-foot south of tribute shaft, and is 200 feet deep ; the latter being level into 200-foot tribute lode. Average width of ore vein, 6 feet, and the levels are 264 feet in length.

The ore in both veins is identical, and is valued at 12 per cent. lead, 25 oz. silver. The silver-bearing minerals being galena and pyrrhotine. Rich bunches are met with occasionally carrying 80 oz. silver per ton, and averaging 58 oz. metallurgical treatment.

The rich ore is separated by hand sorting, and is exported or sent direct to the smelting furnaces at Adelaide. The bulk ore is crushed and concentrated, and tailings are to be leached.

Machinery, &c.—Concentrating mill consists of stone breakers, Krom rolls with self feeder, sizing trommells and hydraulic classifications, ten 4-compartment collerie jigs, four Harz jigs, Huntingdon mill, four Frue Vanners, and double-deck 19-foot diameter sluice tables, ore screw and tailing belt. Concentrates average 60 per cent. of lead and 65 oz. silver per ton. A leaching mill is now being erected, capable of treating 70 tons per day. The furnaces for chlorodizing are Howell's patent revolving cylinders ; tailings from leaching works are returned to fill stopes in the mines.

917. SINCLAIR, G. H., 66 King-street, Sydney.

Silver-lead and Copper Ores from the Mount Costigan Silver-mine, near Tuena. (See description under Mt. Costigan.)

918. WALLAH WALLAH SILVER-MINING SYNDICATE, near Yass.

Silver-lead Ores from the Wallah Wallah Silver-mine, Pudman's Creek.

The Wallah Wallah Silver-field is situated near Rye Park, which is about 16 miles to the south-east of Burrowa. The country rocks are granite and slate. The granite is described by Mr. Geological-Surveyor Anderson as being decidedly intrusive, and has tilted the slates so that they dip off at a high angle. For a short distance from the junction the slates have been considerably metamorphosed, assuming a schistose structure. The silver lodes occur chiefly in the slates beyond the sphere of alteration. The lodes have an approximately north and south strike, which corresponds with that of the country.

The principal lode, and that upon which most work has been done, is on the Wallah Wallah Proprietary's leases. It has already been opened to a depth of 130 feet, by means of shafts and drives at various levels. The workings, which are of considerable extent, have been in lodestuff throughout, which averages about 2½ feet in thickness. The ore consists near the surface of ferruginous gossan carrying carbonate and phosphate of lead, passing at lower levels into argentiferous galena, with more or less zinc blende in patches. A bulk assay from the south end of principal drive gave 34 oz. of silver per ton, with 32 per cent. of lead and 12½ per cent. of zinc. Another assay from bottom of 130-foot shaft gave 43 oz. silver per ton, and 38 per cent. of lead. The total amount of ore sent for treatment up to April, 1891, was 142 tons, which yielded 5,290 oz. of silver, averaging over 37 oz. per ton.

919. WHITE ROCK PROPRIETARY SILVER-MINING COMPANY, Drake.

Ten tons of silver ore from White Rock Silver-mine. (See particulars on previous page.)

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.—Tin.

TIN.

The approximate area of the tin-fields in New South Wales is 5,440,000 acres. According to the official report of Harrie Wood, Esq., Under Secretary for Mines and Agriculture, the value of the total production of tin and tin ore to the end of 1891 amounted to £9,526,796. The tin ore, therefore, ranks next in importance to gold and coal as a source of wealth to the Colony. The existence of tin in New South Wales was known for many years, but it was not till 1871 that any attempt was made to turn this mineral to account as a marketable commodity. The most extensive deposits of ore have been found in the northern portion of the Colony, but tin has also been discovered in other districts. The ore has hitherto been obtained in the beds of watercourses, and it is separated from the gravel by sluicing. In some localities extremely rich deposits of drift tin have been found in the beds of ancient streams, at a depth of from 60 to 200 feet below the surface. Valuable lodes or reefs have been discovered, and in some places crushing machinery has been erected to extract the ore. The tin-bearing granites of New South Wales belong to the same geological era as those of Cornwall. Many years will elapse before the ground now being worked will be exhausted.

In the Vegetable Creek Tin-field alone only about 3 miles of the deep leads have been worked out since their discovery in 1873, and it has been estimated that there are 46 miles in length of deep leads yet to be worked, as shown on the geological map (exhibited) of that tin-field by Mr. T. W. Edgeworth David, B.A., F.G.S., Geological Surveyor. A considerable area of stanniferous country has lately been discovered in the Barrier Ranges.

Numerous specimens of both lode and stream tin-ore are exhibited, showing the different forms in which this mineral has been found in New South Wales; also six tons of refined tin in ingot, bar, and grain.

920. BENSUSAN S. L., 12, O'Connell-street, Sydney.

Tin-ore from Bensusan's (late Butler's) Freehold Tin-mine, near Deepwater, New England.

Mr. Geological Surveyor David, in his report on the Vegetable Creek Tin-field in 1887, states that the Butler's vein has been traced for a distance of a mile through portions 173, 174, and 307 in the parish of Highland Home, county Gough, its average strike being 35° north of east and south of west, and with a north-west dip varying from 72° to 85°. The thickness of the vein varies from 2½ feet to 10 feet, averaging 3 ft. 2 in. The casing is eurite, passing into coarsely crystalline porphyritic granite. The tinstone occurs in seams and bunches, freely crystallized in chloritic quartz.

921. CASTLE WELLINGTON TIN AND SILVER-MINING COMPANY (No Liability); H. M. Deakin, Legal Manager, 70, Pitt-street, Sydney.

Lode and Alluvial Tin-ore from Castle Wellington Tin-mine, situated at the Nine-mile, near Deepwater, New England.

The Company's property consists of 154 acres, of which 100 acres form an alluvial flat, and the remainder a hill. Three rich tin-lodes have been discovered running into the latter near the edge of the alluvial flat, which they are believed to underlie. Tin-bearing gravel is obtained from the alluvial, samples of which are exhibited.

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291 : Collections of Minerals, Ores, &c.—Tin.

922. MINISTER FOR MINES & AGRICULTURE, Sydney.

Collection of Tin Ores from the Tin-fields of New South Wales.

No.	Description.	Locality.	
1	Lode tin ore...	Mole Table-land, Vegetable Creek,	New England.
2	,,	The New Butler's Lode, Mole Table-land,	
3	,,	Butler's Lode, Mole Table-land ; depth, 25 ft. ; lode, 4 ft. wide ;	
4	,,	Dividing Range, between Graveyard and Vegetable Creeks ;	
5	,,	Glen Creek, near Vegetable Creek,	
6	,,	Ottery Lode, Tent Hill ; lode, 2 ft. to 4 ft. 6 in. wide ;	
7	,,	Tent Hill, near Vegetable Creek,	
8	,,	,, ,,	
9	,,	Elliott & Co's Lode, Vegetable Creek,	
10	,,	,, ,, ,,	
11	,,	M'Donald's Mine, Tent Hill,	
12	,,	Vegetable Creek,	
13	,,	Old Gulf Lode, Vegetable Creek Distriet,	
14	,,	,, ,, ,,	
15	,,	,, ,, ,,	
16	,,	Red Cross Mine, The Gulf, near Emmaville,	
17	,,	Bark Hut Lode, Mole Table-land ; depth, 35 ft. ; lode, 3 ft. ;	
18	,,	,, ,, ,,	
19	,,	,, ,, ,,	
20	,,	,, ,, ,,	
21	,,	Dan O'Connell Lode, near Emmaville,	
22	,,	Curnow's Lode, Mole Table-land,	
23	,,	Mole Table-land,	
24	,,	,,	
25	,,	Walleroo Lode, Mole Table-land,	
26	,,	Dutchman's Lode,	
27	,,	Bates and Party, No. 1 Reef, Mole Table-land,	
28	,,	Yankee Lode, The Gulf,	
29	,,	Ford's Lode, Black Swamp,	
30	,,	Jones' Paddock, Tingha,	
31	,,	Dougherty's Mine, Tingha,	
32	,,	Red Hill, Tingha,	
33	,,	Reeve's Claim, Tingha,	
34	,,	Young Cornwall Mine, near Tingha,	
35	,,	Rappenicher's Lode, Tingha,	
36	,,	Pheasant Creek,	
37	,,	King Tin Mine, Pheasant Creek,	
38	,,	The Grampians,	
39	,,	,,	
40	,,	Lane's Lode, Black Swamp,	
41	,,	Madman's Gully, Silent Grove,	
42	,,	Crane's Lode, Nine-mile Creek,	
43	,,	M'Lean's Lode, Slaughterhouse Creek,	
44	,,	Coghlan and Clifford's Mine, The Gulf,	
45	,,	Brown's Gully, The Gulf,	
46	,,	Elsmore,	

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.—Tin.

Minister for Mines and Agriculture, Sydney.—Collection of Tin Ores from the Tin-fields of New South Wales—*continued.*

No.	Description.	Locality.	
47	Lode tin ore	Torrington Lode, Vegetable Creek; depth, 60 ft.; lode, 2 ft. thick;	New England.
48	,,	,, ,, ,,	
49	,,	,, ,, ,,	
50	,,	7½ miles from Tenterfield,	
51	,,	Wilson's Downfall,	
52	,,	Walleroo Lode, Vegetable Creek,	
53	,, (in greisen)	Newstead, near Inverell,	
54	,,	H. Gordon's A.C.P., 480 acres, Strathbogie North, near Emmaville,	
55	,,	,, ,, ,,	
56	,,	,, ,, ,,	
57	,,	Nine-mile, Vegetable Creek,	
58	,,	Block 230, Parish Swinton,	
59	,,	Maryland Tin Mine,	
60	,,	,, ,,	
61	,,	Castle Wellington Mine, Nine-mile, near Deepwater,	
62	,,	,, ,, ,,	
63	,,	Curnow's Shaft, Dutchman's Tin Mine, near Deepwater,	
64	,,	,, ,, ,,	
65	,,	Stevens and Chandler's Mine, Paradise Creek, Deepwater,	
66	,,	Jindabyne, Cooma District.	
67	,,	No. 1 Claim, Poolamacca, Barrier Range.	
68	,,	,, ,, ,,	
69	,,	Wheal Byjerkerno, Barrier Range.	
70	,,	Caloola Mine, Barrier Range.	
71	,,	,, ,,	
72	,,	Lady Don Mine, Barrier Range.	
73	Stream tin wash	Castle Wellington Mine, Nine-mile, near Deepwater,	New England.
74	,,	Emmaville,	
75	,,	,,	
76	,,	Lady Mary Mine, Stannifer,	
77	,,	,, ,,	
78	,,	Walmsley's Lead, Portion 186, Parish Clive, Tingha,	
79	,,	,, ,, ,,	
80	,,	Vegetable Creek,	
81	,, with oxide of manganese.	Near Stannifer,	
82	Siliceous stanniferous cement.	"Grey Billy," Cubis' Ground, Emmaville,	
83	,, ,,	The Grampians,	
84	Stream tin wash	Billins and Party's Claim, Stony Creek, Tingha,	
85	,,	,, ,, ,,	
86	,,	Emmaville,	
87	,,	,,	

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.—Tin.

Minister for Mines and Agriculture, Sydney.—Collection of Tin Ores from the Tin-fields of New South Wales—*continued.*

No.	Description.	Locality.	
88	Stream tin wash	Bismarck Mine, Tingha,	New England.
89	,,	Perry Hill, Vegetable Creek, 50 ft. under Basalt,	
90	Stream tin cement	Wheal Victoria Mine, Parish Herbert, County Gough,	
91	,,	,, ,, ,,	
92	Stream tin ore	Block 41, Parish Swinton,	
93	,,	,, 57, Parish Herbert,	
94	,,	,, 173, ,, ,,	
95		,, 346, ,, ,,	
96	,,	,, 391, ,, ,,	
97	,,	,, 438, ,, ,,	
98	,,	,, 87, ,, ,,	
99	,,	,, 61, ,, Swinton,	
100	,,	,, 137, ,, Clare,	
101	,,	,, 70, ,, Clive, Pond's Creek,	
102	,,	,, 152, ,, ,, Middle Creek,	
103	,,	,, 137, ,, ,,	
104	,,	,, 126, ,, ,, Gilgai, near Inverell,	
105	,, (surface)	Cope's Creek,	
106	,,	Block 257, Red Hill, Cope's Creek,	
107	,,	,, 320, Parish Cope's Creek,	
108	,,	,, 531, ,, ,,	
109	,,	,, 241, ,, Swinton,	
110	,,	,, 147, ,, ,,	
111	,,	,, 4, ,, ,, (Brickwood Mine),	
112	,,	,, 154, ,, ,, (Hardinge Gully),	
113	,,	,, 103, ,, Darby, Sutherland Water,	
114	,,	,, 266, ,, ,, ,, ,,	
115	,,	Moore & Co., Vegetable Creek Tin-mine,	
116	,,	Vegetable Creek,	
117	,,	Block 277, Parish Mayo, Old Farm Creek,	
118	,,	Pine Ridge, near Inverell,	
119	,,	Brickwood Mine, near Tingha,	
120	,,	Elsmore,	
121	,,	Macdonald's River, near Giant's Den,	
122	,, (toad's-eye tin)	Grenfell,	
123	Surface tin ore	Glen Creek, Mole Tableland,	New England.
124	,,	Lottery Creek,	
125	Stream tin ore (nuggets))	Butchart's Mine, Cope's Creek,	
126	,, ,,	,, ,,	
127	,, ,,	,, ,,	
128	,,	Nuggety Gully, The Gulf, Vegetable Creek,	
129	,,	Clarke & Co.'s Claim, The Grampians,	
130	,,	Deep Lead, Graveyard Creek,	
131	,,	Irby, Andrews, & O'Donnell's Mine,	
132	,,	Ruby & Harding's Claim, Dividing Range,	
133	,,	Scott & Party's Claim, Nine-mile Creek,	
134	,,	Block 177, Parish Clive,	
135	,,	Lewis & Party's Claim, Grampians,	
136	,,	A. Cadwell's Block, Surface Hill,	
137	,,	Ruby Creek,	
138	,,	Block 346, Parish Herbert, Stannifer,	
139	,,	Middle Creek, Stannifer,	
140	,,	Oban, near Deepwater.	

923. Collection of Block Specimens of Tin Ores.

No.	Description.	Locality.	
1	Lode tin ore.....	Mole Table-land,	New England.
2	,, ...	,, ,,	
3	,, ...	Torrington Lode, Mole Table-land,	
4	,, ...	,, ,,	
5	,, ...	,, ,,	
6	,, ...	M'Leod's Lode, ,,	
7	,, ...	The Gulf Lode, ,,	
8	,, ...	Butler's Lode, near Emmaville,	
9	,, ...	,, ,,	
10	,, ...	Ottery Lode,	
11	,, ...	,,	
12	,, ...	Elliott & Co.'s Lode,	
13	,, ...	,, ,,	
14	,, ...	Trewhella & Co.'s Lode,	
15	,, ...	Jones and Party's Lode,	
16	,, ...	near Emmaville,	
17	,, ...	,,	
18	,, ...	,,	
19	,, ...	,,	
20	,, ...	,,	
21	,, ...	Gundle, Kempsey District.	
22	,, ...	Wheal Byjerkerno Mine, Euriowie, Barrier Range.	
23	,, ...	,, ,, ,,	
24	,, ...	Mount Euriowie, Euriowie, Barrier Range.	
25	,, ...	Caloola Mine, ,, ,,	
26	,, ...	Lady Don Mine ,, ,,	

924. Half-ton of Lode Tin Ore from the Ottery Tin Lode, Mole Tableland, New England.

* The *Ottery* veins occur in dyke masses of hornblendic granite and eurite, within 8 chains from the margin of the claystone. The main vein with the cross vein has been proved to be productive of tin for a distance of over ¼ mile, and for a vertical extent of 169 ft. The well-defined nature of the walls, the strong slickensides, and the quantity of clay fluean lining the veins, proclaim this to be a true fissure vein. It will be noticed that in all cases where the inclination of the vein from the vertical became suddenly lessened, it became pinched and unproductive, confirming the well-known experience of miners that those parts of a vein which most nearly approach the vertical are generally the richest. The strike of the veins follows approximately that of the junction line between the porphyrite and claystone. The dip, except in the case of the west vein, is north-westerly, following the underground line of junction between the crystalline rocks and the claystone, giving these ore bodies the character of contact deposits. The ore in these veins occasionally runs in shoots, which dip to the north-east, following, perhaps, the dip of the sedimentary rocks in the immediate neighbourhood. The shooty character of the ore is, however, less observable here than elsewhere. Twelve hundred tons of veinstone from these veins, crushed at Tent Hill, yielded a trifle under 5 per cent. of tinstone, and subsequent crushings have yielded a little over 3 per cent.

925. Lode and Alluvial Tin Ore from the Wheal Australia Tin-mine, Parish Herbert, County Gough.

926. Lode and Alluvial Tin Ore from the Wheal Victoria Tin-mine, Parish of Herbert, County Gough, between Cope's Creek and the Maeintyre River.

* Geology of the Vegetable Creek Tin-field, per T. W. E. David, B.A., F.G.S., Geological Surveyor.

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.—Tin.

927. Alluvial Tin Ore from the Wheal Edith Tin-mine, New England.

928. Tin Ores, from the Torrington Tin Lode, Mole Tableland, New England, Parish of Annandale, County Clive.

*The country is a coarsely crystalline granite, composed of triclinic and monoclinic felspar, with abundant dark mica quartz, and a little muscovite and hornblende. Near the north-east end of the main vein, the granite is fine-grained and intersected by veins of eurite, which latter frequently forms one of the walls of the vein. . . . The average strike of the vein is 36° north of east and south of west. The veins consist of fine-grained felstone or eurite, fairly soft from the surface to a depth of from 30 to 40 ft., when it becomes very hard. In some cases the veinstone is separated by a sharp line from the granite country, while in others it merges gradually into that rock. Tinstone occurs in disseminated crystals or thin strings in the felspathic vein-stuff, generally running in shoots or floors, the ore being partly black and partly resin, while some of the crystals are quite translucent. . . . The north-west branch of the main Torrington vein . . . at 92 yds. along its strike from the south-west end, the vein joins the main Torrington vein. A shoot of ore has been worked out of this branch vein, commencing, near the surface at the point of junction, in a south-west direction for a horizontal distance of 120 ft., in which distance the shoot dipped 40 ft. . . . A rich shoot was worked here from near the surface to a depth of 135 ft. The shoot pitched 40° east of north and west of south, at an angle of 45°, and was 2 ft. wide where widest, averaging 10 in. The hanging wall was well defined. In part of the workings, an intrusive dyke of eurite formed the foot-wall of the vein. Close to where the cross course of eurite intersects the vein a bunch of ore was got out of 64 cubic ft. of vein-stuff, weighing 13 tons.

929. Tin Ore from the Red Cross Tin-mine, Emmaville, Vegetable Creek, New England.

*Red Cross Lode in portion 18, parish of Muir, county Gough, strikes 43° north of east and south of west, dipping 85° north-westerly; average width, 12 in. The vein consists of nearly solid tinstone, replaced occasionally by quartz and chlorite. The tinstone is black, deep red, resin, and translucent. The ore at the centre of the vein is coarsely crystalline, but becomes finer towards the walls. The foot-wall shows faint slickensides. The vein is cased by hard quartzose granite. At the bottom of a shaft on the vein, 35 ft. deep, the vein was 1 ft. in width.

930. Tin and Copper Ore from the Gumble Mine, near Molong.

Assays made of ores from this mine have yielded up to 60 per cent. of metallic tin, 14 per cent. of metallic copper, and 8 oz. of silver, and a trace of gold, per ton.

931. Rich Lode Tin Ore, from the Dolcoath Tin-mine, Glen Creek, New England.

932. Tine Ore from the Cosmopolitan Extended Tin-mining Company's Mine, Barrier Ranges.

†This property adjoins the Cosmopolitan South, and the lodes of the former can be plainly traced through the ground, which consists of 64 acres.

933. Tin Ore from the Cosmopolitan Tin-mining Company's Mine, Barrier Ranges.

†The mine is situated about 50 miles north of Silverton, and consists of one 40-acre block, containing two well-defined lodes.

---

*Geology of the Vegetable Creek Tin-field, per T. W. E. David, B.A., F.G S., Geological Surveyor.
†From a report on the Barrier Range (Poolamacca) tin lodes, by the late C. S. Wilkinson, F G.S etc., Government Geologist, Annual Report, Department of Mines, 1887.

934. Tin Ore from the Albion Tin-mine.

* On the south side of Yancowinna Creek, in portion 95, is the Albion lode of coarse crystalline granite in altered slate formation, dipping W. 25° N. at 80°. A shaft has been sunk 22 ft. deep, 100 ft. further south a cutting 4 ft. deep has been made showing the lode 7 ft. wide, with a small patch of tin ore in centre. Near the south-west corner of portion 95 is a lode 25 ft. wide showing a little tin and tourmaline; within 10 chains east are a few other lodes; one, from 1 to 2 ft. thick, containing some tin and brown garnets, has been opened 3 ft. deep; it strikes N. 40° E. in chlorite slate.

935. Tin Ore from Mount Euriowie Tin-mining Company's Mine.

* The Company holds 180 acres north of Caloola Creek, through which a continuous outcrop of lodestuff occurs. The lode varies from 3 ft. to 20 ft. in thickness. Specimens exhibited are fair average specimens of lodestuff.

One of the most regular lodes yet opened is that which runs for about half-a-mile through the Euriowie north portions. In this, also, the tin is seen to be more regularly distributed through the granite than is usually the case. But even this lode, or granite dyke, which it really is, varies in width from 1 to 18 ft., and runs in breaks, thinning out at intervals, and making again within a few feet on the west side; nevertheless, the lode appears to be sufficiently persistent to be worked on a large scale.

It is stated that a parcel of 20 tons of it, crushed at the Umberumberka machine, yielded at the rate of 8 per cent. of oxide of tin. The lode strikes N. 13° W., and has a westerly dip; it consists of coarsely crystalline granite with large flakes of mica, and traverses altered mica schists, which strike north and south. The same lode continues into the Euriowie South Company's ground.

936. Tin Ore from the Trident Tin-mine, Barrier Range.

* About 4 miles south of the Victory Mine is the Trident Tin-mine. Here, within a width of 130 ft., the slate formation is traversed by several granite dykes, one 12 ft. wide, very micaceous and quartzose in places, with coarse tin crystals unevenly distributed. A shaft 60 ft. deep has been sunk, and the shallow alluvial in a small gully draining from the lodes has been surfaced for a few yards, and several bags of "shed tin" obtained.

937. Tin Ore from Victory Tin-mining Company's Mine, Barrier Range.

* On the same line of strike as the Queen Victoria and Prince of Wales United Company's lode towards the south, other lodes crop out through the Victory Company's ground. Some of these are being prospected, and a shaft 40 ft. deep has been sunk in one 8 ft. 4 in. wide. This lode strikes N. 10° W., and consists of coarse crystals of felspar, mica, and quartz, with tin ore in patches, which, if worked separately, would probably yield 20 per cent. of ore.

938. Tin Ore from the Wee Jim Tin-mining Company's Mine, Barrier Ranges.

939. Tin Ore from the Jubilee Tin-mine, Poolamacca, Barrier Ranges.

* One mile in a S.S.E. direction from Caloola are the Jubilee Company's lodes. One, 18 in. wide but thinning out on the north end, consists chiefly of quartz and felspar, with but little mica; the tin ore occurs in patches, containing about 10 per cent. of tin ore. Another granite lode, 2 chains to the east, is 2 ft. 6 in. wide, and has been opened for 6 ft. from the surface; only a little tin ore is visible in it.

940. SPIERS & RIGG, 70, Pitt-street, Sydney.

Tin Ore and Gem Stones from the Oban Tin and Gem Mine, New England.

* From a report on the Barrier Range (Poolamacca) tin lodes, by the late C. S. Wilkinson, F.G.S., &c. Government Geologist, Ann. Rept. Dept. of Mines, 1887.

COPPER.

Several copper lodes have been opened in the Colony; the principal ones are the Cobar, Nymagee, Burraga, Mount Hope, and Burly Jacky. Samples of the characteristic ores are exhibited, together with 6 tons of metallic copper ingots. The value of the production of copper during 1891 was £205,093; and the value of the total production to the end of 1891 amounted to £6,023,431. The approximate area of cupriferous country in New South Wales is 6,713 square miles.

941. ENGELEN, J. B., Sheridan-street, Gundagai.

Copper Ore.

942. GREAT COBAR COPPER-MINING COMPANY (Limited), 131, Pitt-street, Sydney.

Five Tons of Yellow Sulphide Ore from Cobar Copper-mine.

The greatest depths obtained by sinking the main shaft is 564 ft. from which level diamond-drill bores have been put down an additional 60 ft., the lode being 40 ft. in width, of fair yellow sulphide ore. Stoping has been carried out on the 15, 28, 39, and 54 fathoms, and some intermediate levels; but, with the exception of the 54-fathom level, the ores obtained are carbonates, oxides, and gray ores, which average about 16 per cent. of copper. A new discovery has been made between the 29 and 36 fathom level, which would average about 14 per cent; but, independently of this find, it will take years to work out the different copper ores in sight, and known to exist in the mine.

An assay of the refined copper smelted from the above ores gave 92·65 per cent. of copper, 2 oz. 12 cwt. 4 gr. of gold, and 1 oz. 5 dwt. of silver per ton.

The following particulars of the quantity and value of the output from the Great Cobar Copper-mine have been supplied by the Secretary to the Company:—

From June, 1876, to 30th June, 1883—

	Tons.
Ore raised	197,750
Ore smelted	197,589
Refined copper obtained	22,354

Value realised, £1,127,332.

Owing to the low price of copper, and great distance of carriage, this mine has for the present been shut down.

943. MINISTER FOR MINES & AGRICULTURE, Sydney.

Collection of Copper Ores from New South Wales.

No.	Description.	Locality.
1	Malachite	Great Cobar Copper-mine.
2	,,	,, ,,
3	,,	,, ,,
4	,, and a little chessylite	,, ,,
5	,,	New Mount Hope Copper-mine.
6	,, chessylite, and cuprite	,, ,, ,,
7	,, (earthy)	Nymagee Copper-mine.
8	,, and chessylite, in thin streaks, in felsitic gangue.	New Mount Hope Copper-mine.
9	Chessylite-gossan ore	Dungowan, Tamworth district.
10	Chessylite	25 fathoms level, Great Cobar Copper-mine.
11	,,	25 fathoms level ,, ,,
12	,,	25 fathoms level ,, ,,

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291 : Collections of Minerals, Ores, &c.—Copper.

Minister for Mines and Agriculture, Sydney.—Collection of Copper Ores from New South Wales—*continued.*

No.	Description.	Locality.
13	Chessylite and malachite	25 fathoms level Great Cobar Copper-mine.
14	,, ,,	38 fathoms level ,, ,,
15	,, ,,	Great Barrier Copper-mine, Barrier Ranges.
16	,, ,,	,, ,, ,,
17	,, ,,	,, ,, ,,
18	,, ,,	Wiseman's Creek, Copper-mine.
19	,,	Cooroowong, 15 miles from Delegate.
20	,,	Payton's Mine, Eugowra.
21	Stanniferous copper ore	No. 2 shaft, 25 feet level, Gumble, near Molong.
22	,, ,,	,, ,, ,,
23	,, ,,	,, ,, ,,
24	Cuprite, with chessylite and malachite	25 fathoms level, Great Cobar Copper-mine.
25	,, ,, ,,	Great Cobar Copper-mine.
26	,,	,, ,,
27	,,	,, ,,
28	,,	,, ,,
29	,, and a little malachite	,, ,,
30	,,	,, ,,
31	,, veins, with malachite	New Mount Hope Copper-mine
32	,,	,, ,, ,,
33	,,	Proprietary Mine, Broken Hill, Barrier Ranges.
34	,, with native copper and carbonate of copper.	Wiseman's Creek.
35	,,	Girilambone.
36	Redruthite	Great Blayney Copper-mine.
37	,,	Great Cobar Copper-mine.
38	,,	,, ,,
39	,, (metallic copper, 41·55 per cent.)	Wellington.
40	,,	Bingera.
41	Chaleopyrites	70 fathoms level, Great Cobar Copper-mine.
42	,,	54 fathoms level ,, ,,
43	,,	Great Cobar Copper-mine.
44	,,	,, ,,
45	,, with quartz and molybdenite	Nymagee Copper-mine.
46	,, (auriferous)	Gordon Mine, Buckinbar.
47	,, ,,	,, ,,
48	,,	80 feet from surface, Doleoath Mine, Cargo.
49	,,	Cheshire Mine, near Cudgegong.
50	,,	Burraga Copper-mine, near Rockley.
51	,,	Burly Jacky Mine, near Woodstock.
52	,,	,, ,, ,,
53	Bornite (copper 50 per cent.)	,, ,, ,,
54	Native copper	Great Cobar Copper-mine.
55	,, and cuprite	Proprietary Mine, Broken Hill, Barrier Ranges.
56	,,	,, ,, ,,
57	,,	South Mine ,, ,,
58	,,	Central Mine ,, ,,

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.—Copper.

944. MINISTER FOR MINES & AGRICULTURE, Sydney.

Collection of Block Specimens of Copper Ores.

No.	Description.	Locality.
1	Malachite and earthy cuprite	Great Cobar Copper-mine, Cobar.
2	Earthy cuprite and malachite	,, ,, ,,
3	Cuprite	,, ,, ,,
4	,,	,, ,, ,,
5	,, with malachite	,, ,, ,,
6	,, ,, and chessylite	,, ,, ,,
7	Earthy cuprite with malachite and chessylite	,, ,, ,,
8	Malachite and redruthite	,, ,, ,,
9	,, in lodestuff	,, ,, ,,
10	Redruthite	,, ,, ,,
11	Chalcopyrite	,, ,, ,,
12	,,	Nymagee Copper-mine, near Cobar.
13	,,	Burraga Copper-mine, Bathurst District.
14	Malachite	Mount Costigan mine, near Tuena.
15	Bornite	Burly Jacky Copper-mine, Woodstock.
16	Redruthite coated with malachite	Near Wellington.

945. Copper Ores from Nymagee Copper-mine.

The ores shown from the Nymagee Copper-mine, 42 miles south-east of Cobar, consist of earthy blue and green carbonates and gray and yellow sulphides. The metallic copper obtained from these ores is of the purest quality, being remarkably free from injurious foreign metals. An assay of it gave 99·74 per cent. of metallic copper, with 3 dwt. of silver per ton, and no gold.

The Inspector of Mines, in his Annual Report for 1884, states that the yellow sulphide ore has been traced through the mine for a distance of about 500 ft., averaging in parts from 10 to 15 ft. in width. . . . In Pope's shaft, between the 50 and 70 ft. levels, the lode consists of carbonates mixed with earthy matter about 40 ft. in width, some of which is rich enough to go direct to the ore-breaker, and the remainder is treated through the crusher and jigger.

During the half-year ending 17th February, 1892, the ore raised amounted to 4,456 tons, and the ore smelted amounted to 4,511 tons, equal to 435½ tons of fine copper.

512 tons 7 cwt. 3 qr. 15 lb. of copper were refined and dispatched.

£94,000 has been paid in dividends since the formation of the Company, equal to £1 3s. 6d. per £1 share.

946. Copper Ore, Burraga Copper-mine, Bathurst District.

The Burraga Copper-mine is the property of Mr. Lewis Lloyd, and is situated on the highest point of the Abererombie Ranges, New South Wales. It is said to have yielded upwards of £300,000 worth of copper during the past seven years. Three lodes are being worked, averaging from 3 ft. to 20 ft. wide; deepest shaft, 240 ft. The ore consists of yellow sulphides, averaging about 10½ per cent. copper.

947. Blue and Green Carbonates of Copper, from Great Barrier Copper and Silver Mine, Silverton.

948. Copper Ores from Apsley, 3 miles south of Wellington, from surface.

949. Copper Ore from the Girilambone Copper-mine, West Bogan.

ANTIMONY.

Antimony ores have been found in numerous parts of the Colony. The principal lodes occur in the Macleay, Hillgrove, Clarence, Gulgong, and Cudgegong Districts. Those on the Munga Creek, near the Macleay River, traverse sedimentary rocks of Devonian age. The ores, consisting of oxide and sulphide of antimony, occur in irregular bunches, occasionally of considerable size, associated with quartz, which forms the chief constituent of the lodes.

The lodes at Hillgrove are payably auriferous, gold being visible both in the quartz and in the sulphide of antimony. Samples of these auriferous ores are included in the collections exhibited.

The value of antimony exported to the end of 1891 is £115,798.

950. LARK & SONS, Wynyard-street, Sydney.

Antimony Ores, Crude Antimony, Regulus (star), and Oxide, from Carangula Antimony Mines, Macleay River.

The antimony deposits are situated at Munga Creek, 4 miles above its junction with the Macleay River. Mr. Geological Surveyor Young (Annual Report, Department of Mines, 1880) states that "in the neighbourhood of the mines the strata have been highly disturbed, causing the country to assume a broken character, a point which, taken in conjunction with variation exhibited in the strike of the lodes, and the frequent appearance of 'slickensides,' may be considered as favourable to the presence of mineral deposits of an irregular nature. The antimony ore occurs in irregular bunches of considerable size, enclosed in a quartz matrix, which forms the chief constituent of the lodes. The ores consist of stibnite (sulphide) and cervantite (oxide). The stibnite is of a high degree of purity, and the cleavage faces of crystals are remarkably large and brilliant."

951. MINISTER FOR MINES & AGRICULTURE, Sydney.

Collection of Antimony Ore from New South Wales:—

No.	Description	Locality.
1	Stibnite	From 60-feet level, Carangula Antimony Mine, Macleay River.
2	,,	,, ,, ,,
3	,, with a little cervantite	,, ,, ,,
4	,, ,, ,,	,, ,, ,,
5	,, ,, ,,	,, ,, ,,
6	,, ,, ,,	Carangula, Macleay River.
7	,,	,, ,,
8	,,	Carangula (2 ft. thick, 120 level), Macleay River.
9	,,	Bolt's Lease, Carangula, Macleay River.
10	,,	,, ,, ,,
11	,,	Salonica Mine ,, ,,
12	,, (auriferous)	Eleanora G. & A. Mine, Hillgrove, near Armidale.
13	,, ,,	,, ,, ,,
14	,, ,,	,, ,, ,,
15	,, ,,	,, ,, ,,

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.—Bismuth, &c.

Minister for Mines and Agriculture, Sydney.—Collection of Antimony Ore from New South Wales—*continued.*

No.	Description.	Locality.
16	Stibnite (auriferous)	Lady Carrington Mine, Hillgrove, near Armidale.
17	,, ,, ...	,, ,, ,,
18	,, ,, ...	Nine miles from Hillgrove, near Armidale.
19	,, ,, ...	,, ,, ,,
20	,, ,, ...	Metallic antimony, 36·47 per cent., Hillgrove, near Armidale.
21	,, ,, ...	Gara Falls, Hillgrove, near Armidale.
22	,, ,, ...	Parish of Buckrabandmi, County Raleigh.
23	,, ,, ...	Bowra, Nambucca District.
24	,, ,, ...	Perseverence Reef, Lunatic, Clarence District.
25	,, ,, ...	Pretty Gully, Lunatic, Clarence District.
26	,, ,, ...	Cudgegong.
27	,, ,, ...	Euingar Mine, Clarence River District.
28	,, ,, ...	Oakenville, Nundle, Peel River.
29	Cervantite.....	Ford's Creek, near Gulgong.
30	,, ...	,, ,,
31	,, ...	,, ,,
32	,, ...	Cudgegong.
33	,, and stibnite	Carangula, Macleay River.

BISMUTH, MOLYBDENUM, WOLFRAM, ZINC, MERCURY, PLATINUM, &c.

Bismuth ores have been found in the tin-bearing drifts, and also in lodes at Silent Grove, The Gulf (in the Vegetable Creek District), Kingsgate and Hogue's Creek, near Glen Innes, Elsmore, Tenterfield, Adelong, Mount Gibbs in the Barrier Range, and Gumble in the Molong District, near Captain's Flat in the Molonglo District, where it occurs in the form of tetradymite (bismuth telluride); Nimitybelle; and recently at Whipstick, near Pambula, where it occurs associated with rich silver ore (chloride).

At Kingsgate a lode is reported to be 6 ft. to 8 ft. wide, from which samples of metallic bismuth have been taken weighing from 1 to 50 lb. Samples of the ores from this locality are shown in the collection.

Molybdenum, in the form of molybdenite, occurs with the bismuth ores at Kingsgate, near Glen Innes, and in smaller quantities in many reefs. Wolfram occurs at Hogue's Creek, near Glen Innes, near Emmaville, at Mount Hope, Lachlan District, near Wagga, and at Berrydale, near Cooma. Samples from each locality are shown. Zinc, in the form of sphalerite, is of frequent occurrence in the auriferous and other veins. It also occurs in vast quantities in the great Broken Hill silver lode, associated with galena and silver sulphide. It is highly probable that shortly the zinc will be produced in a marketable form. Calamine has been discovered near Bredbo, a sample of which is exhibited. Cinnabar has been found (in a drift) at Cudgegong, in the Mudgee District, and also near Bingera, Scone, and Solferino.

Platinum in minute grains has been noticed in small quantities in the gold-bearing gravels of several gold-fields. Its occurrence in the beach sand on the north coast between the Richmond and the Tweed has been known for many years, but no attempt to concentrate

the platinum has been made until very recently. Beach washing for gold has been carried on on a small scale for years, especially after south-easterly gales. The sand consists of quartz, zircon, ilmenite, and cassiterite. A sample of the beach sand, concentrated in a small experimental model of R. Young's classifier and concentrator, from 1 cwt. to 3lb., yielded on assay in the Department of Mines Laboratory: Platinum, 21 oz. 17 dwt. 16 gr.; gold, 13 oz. 7 dwt. 20 gr. per ton of concentrates, and 19·28 per cent. of tin.

952. MINISTER FOR MINES & AGRICULTURE, Sydney.

Collection of Bismuth, Tungsten, and Mercury Ores, and Platiniferous Sand from New South Wales.

No.	Description.	Locality.
1	Bismuthite in lode stuff	Kingsgate, near Glen Innes.
2	,,	Foot-wall, Kingsgate, near Glen Innes
3	,,	Kingsgate, near Glen Innes.
4	,,	,, ,,
5	,, in ferruginous lode stuff	O'Farrell's lode, near Mount Gipps, Barrier Range.
6	,, ,,	(Metallic bismuth 43 per cent.), 13 miles from Broken Hill, Barrier Range.
7	Native bismuth and molybdenite in quartz veinstone.	Kingsgate, near Glen Innes.
8	,, ,, ,,	,, ,,
9	,, ,, ,,	,, ,,
10	,, ,, ,,	
	Bismuthite, native bismuth, and molybdenite in quartz veinstone.	Foot-wall, 25 ft. level, Kingsgate, near Glen Innes.
11	Native bismuth in quartz veinstone	12 ft. level, Kingsgate, near Glen Innes.
12	,, with oxide and carbonate of bismuth.	Kingsgate, near Glen Innes.
13	,, with oxide of bismuth	,, ,,
14	,, with sulphide of bismuth	,, ,,
15	Sulphide of bismuth	,, ,,
16	,,	,, ,,
17	Bismuth lode stuff	,, ,,
18	Molybdenite	,, ,,
19	,,	,, ,,
20	,,	,, ,,
21	Cinnabar in lodestuff	Kelly's Claim, Solferino.
1	Wolfram	Vegetable Creek District, New England.
2	,,	
3	,,	Campbell's Reef, Severn River, New England.
4	,,	,, ,,
5	,, in lode stuff	Hogue's Creek, near Glen Innes, New England.
6	,, in quartz veinstone	,, ,,
7	,,	Near Mount Hope, Lachlan River.
8	Scheelite	Gara Falls, 12 miles east from Armidale.
9	,, with stolzite	Cordillera Hill, near Tuena.
10	Platinum, gold, and cassiterite in beach sand	Evans' Head, near Ballina, Richmond River District.
11	,, ,, concentrated in R. Young's patent classifier and concentrator.	

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291 : Collections of Minerals, Ores, &c.—Iron, Manganese, &c.

IRON, MANGANESE, CHROMIUM, AND COBALT.

Deposits of iron ore, chiefly magnetite, brown hematite, limonite, and bog iron ore, occur in numerous parts of New South Wales : in the Picton, Mittagong (Fitzroy), Berrima, Goulburn, and Binalong Districts on the Great Southern Railway ; in the Wallerawang, Newbridge, Carcoar, Cowra, and Dubbo Districts, on the Great Western Railway ; and in the northern districts near Muswellbrook and Stroud, and in the Clarence District.

Many of these deposits are so situated as to be readily accessible to coal and limestone, as at Mittagong, where iron smelting operations have been conducted upon a very limited scale. The quantity of iron ore in sight near Mittagong has been estimated by Mr. Wilkinson, Government Geologist, to be about 2,872,000 tons, giving an average yield on analysis of 48·40 per cent. of metallic iron. In working, these deposits might be supplemented by those in the Goulburn District. The deposits which are available for the smelting works at Lithgow Valley occur chiefly in the Wallerawang and Blayney Districts. Chrome iron ores occur in quantity at Nundle, Peel River ; Gordon Brook, Clarence River, near Bingera and Barraba ; and near Coolac, Gundagai District."

Manganese ores occur at Bendemeer, Rockley, Glanmire, and other localities.

Cobalt ore occurs at Carcoar, near Bungonia, and Port Macquarie. At Carcoar it occurs as an arsenide, and at the two latter places as a sesquioxide in manganese oxide.

953. BRAZENALL, W., junr., Mittagong.

Iron Ore and Coal from the Mittagong District.

Limestone from Marulan.

Pig Iron, Castings, &c., manufactured from the above iron ore.

The iron ore deposits of the Fitzroy or Mittagong, and Berrima Districts, from some of which the preceding exhibit was taken, consist of brown hematite, limonite, and bog iron ore. They occur chiefly in ten different localities, nine of these being within 5 miles from the old Fitzroy Iron Smelting Works, and one on the Oldbury Estate near Berrima, about 4½ miles from the railway line at Moss Vale.

The ore has been formed from ferruginous springs on the surface, in Tertiary strata, or in trap dykes. The Government Geologist has estimated the quantity of ore in sight in these different deposits to be about 2,872,000 tons, yielding on analysis from 26·77 to 61·39 per cent. of metallic iron—the average of twenty analyses being 48·40 per cent. of metallic iron. Coal is worked at the Mittagong and Berrima mines, and the nearest limestone is at Marulan, 37 miles by rail from Mittagong.

Other rich deposits of brown hematite occur in the Goulburn District, distant 55 miles by rail from Mittagong.

954. BRECKENRIDGE & WATSON, Newcastle.

Iron Ore and Limestone from Exhibitors' property at Port Stephens.

At Ironstone Mountain, in the Port Stephens District, occurs a bed of magnetic iron ore, from which the sample exhibited was taken. Mr. Geological Surveyor David, who has examined and reported upon it, states that the bed of ore is from 3 to 4 ft. thick, and can be traced for over a quarter of a mile. The result of six analyses shows that the ore contains from 37·71 to 48·33 per cent. of metallic iron ; it also contains as much as 7·30 per cent. of titanic acid, 18·70 per cent of silica, and 5·28 per cent of alumina. There is a considerable quantity of limestone close to the deposit of magnetic iron, which is 3 miles west of the navigable water of the Karua River, an arm of Port Stephens. Further particulars of this deposit of iron ore, with a complete analysis of it, will be found in the Annual Report of the Department of Mines, 1889, page 217.

ANALYSIS.

Moisture at 100° C	·67
Combined moisture	3·31
Iron peroxide	52·86
Iron protoxide	7·79
Manganese protoxide	trace
Alumina	5·21
Silica	18·70
Iron peroxide	·75
Lime	1·12
Magnesia	trace
Titanic acid	7·30
Carbonic acid	1·60
Phosphoric acid	trace
Sulphuric acid	,,
Organic matter	,,
	99·44

955. DONNELLY, D. C. J., M.P., Cowra.

Two tons of Magnetic Iron Ore, from Broula Range, 11 miles from Cowra Railway Station, and about 270 miles west of Sydney, or about 90 miles from the nearest coal deposits at Wallerawang.

ANALYSIS.

Moisture at 100° C	·100
Combined water	·520
Iron peroxide	79·707*
Iron protoxide	13·036*
Manganese	·186
Silica	3·230
Titanic acid	trace
Alumina	2·784
Lime	·392
Magnesia	trace
Phosphoric oxide	,,
Sulphuric oxide	,,
Carbonic acid	,,
	99·755

* Equal to 65·92 per cent. of metallic iron.

The lode, which is from 1 to 2 chains wide, occurs in the Broula Range, the prevailing rocks of which are granite, porphyry (*verde antique*), slate, with belts of marble limestone, the latter in places forming the western wall of the lode.

956. ENGELEN, J. B., Sheridan-street, Gundagai.

Chromite, from 18 miles east of Gundagai.

957. HAYES, W. G., The Hermitage, Picton.

Two tons of Brown Hematite, from The Hermitage Estate, near Picton.

The Picton iron deposits are situated 8 miles from that town, which is 53 miles from Sydney. The ores consist of brown hematite, and are described by the late Government Geologist as being precisely similar in origin to those of Mittagong, having been formed at the surface by ferruginous springs. In the deposit from which the above exhibit was taken, the same officer estimated that about 800,000 tons of ore are available.

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 230 and 231: Collections of Minerals, Ores, &c.—Iron, Manganese, &c.

ANALYSIS.

Moisture at 100° C	2·05
Combined water	10·33
Ferric oxide	70·57*
Ferrous oxide	Nil.
Manganous oxide	·33
Alumina	6·53
Silica	9·41
Lime	·32
Magnesia	·08
Phosphoric oxide	·35
Sulphuric oxide	Nil.
Titanic acid	,,
Organic matter	,,
	99·97

* Equal to 49·39 per cent. of metallic iron.

958. HAYTON, G., Newbridge.

Brown Hematite, from Newbridge, equal to 55½ per cent. of metallic iron. Ore from this deposit was used during iron smelting at Lithgow some years ago.

959. MINISTER FOR MINES & AGRICULTURE, Sydney.

Collection of Iron, Manganese, and Cobalt Ores from New South Wales.

No.	Description.	Locality.
1	Brown hematite *Analysis.* Peroxide of iron 76·32 Protoxide of iron 11·23* Silica 6·25* Alumina 3·04 Phosphoric oxide (P_2O_5) trace *Equal to metallic iron 62 6 per cent.	Norwood, near Goulburn.
2	Brown hematite... *Analysis.* Peroxide of iron 69·44* Alumina 6·16 Phosphoric acid (P_2O_5) 1·30 Insoluble in acids 7·50 *Equal to metallic iron 48.60 per cent.	Joppa, near Goulburn.
3	Brown hematite	Kingsdale, near Goulburn.
4	,, *Analysis.* Peroxide of iron 84·55* Silica 2·47 Alumina 1·14 Phosphoric acid (P_2O_5) 0.66 *Equal to metallic iron 59·18 per cent.	Willeroo Station, Lake George, near Goulburn.
5	Brown hematite	Willeroo Station, Lake George, near Goulburn.

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.—Iron, Manganese, &c.

Minister for Mines and Agriculture, Sydney.—Collection of Iron, Manganese, &c.—*continued.*

No.	Description.	Locality.
6	Brown hematite	Near Goulburn.
	Analysis.	
	Peroxide of iron..... 80·60*	
	Alumina ..... 3·35	
	Insoluble in acids .... 1·90	
	Phosphoric oxide (P_2O_5)..... 1·35	
	*Equal to metallic iron 56·42 per cent.	
7	Brown hematite	Near Crookwell.
8	,, ...	Fitzroy Mine, Mittagong.
	Analysis.	
	Peroxide of iron..... 68·37*	
	Silica ..... 14·10	
	Alumina ..... 4·63	
	Phosphoric oxide (P_2O_5)..... trace	
	*Equal to metallic iron 47·86 per cent.	
9	Brown hematite	Fitzroy Mine, Mittagong.
10	,, ...	,, ,,
11	,, (clayey)	Brazenall's property, Mittagong.
12	,, (bog)	Fitzroy Mine, Mittagong.
13	,, ,, ...	,, ,,
14	,, ,, ...	,, ,,
15	,, (stalactitic)	,, ,,
16	,, (pisolitic)	Berrima.
17	,, ,, ...	,,
18	,, ...	15 miles from Marulan.
19	,, (stalactitic)	Near Burragorang.
20	,, ...	Between Crookwell and Binda.
21	,, ...	Maxfield, Boro.
22	,, (concretionary)	Nowra, Shoalhaven River.
23	,, ...	Picton.
24	,, ...	,,
25	,, ...	,,
26	,, ...	Boro, Long Swamp, between Goulburn and Bungendore.
27	,, ...	8 miles west of Yass.
28	,, ...	Westbrook, Singleton.
	Analysis.	
	Peroxide of iron..... 60·11*	
	Silica .... 10·90	
	Alumina ..... 9·36	
	Phosphoric oxide (P_2O_5)..... 0·73	
	* Equal to metallic iron 42·07 per cent.	
29	Brown hematite	Mount Victoria, G. W. Railway Line.
30	,, ...	Hartley Vale, G. W. Railway Line.
31	,, ...	Brown's Gap ,, ,,
32	,, ...	,, ,, ,, ,,
33	,, ...	Mount Edgecombe ,, ,,
34	,, ...	Mount Wilson Siding, G. W. Railway Line.
35	,, ...	,, ,, ,,
36	,, (concretionary)	Mount M'Donald, G. W. Railway Line.
37	,, ...	,, ,, ,,
38	,, ...	Kanimbla Valley, Blackheath, G. W. Railway Line.

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.—Iron, Manganese, &c.

Minister for Mines and Agriculture, Sydney.—Collection of Iron, Manganese, &c.—*continued.*

No.	Description.	Locality.
39	Brown hematite	Wallerawang.
40	,,	,,
41	,, (stalaetitic)	Piper's Flat, near Wallerawang.
42	,, (40 feet level)	Newbridge, 8 miles from Blayney.
43	,,	,, ,,
44	,, (37 feet level)	,, ,,
45	,,	,, ,,
	Analysis.	
	Oxide of iron (Fe_2O_3) ..... 68·04*	
	Silica ..... 6·95	
	Phosphoric acid (P_2O_5) ..... 2·28	
	* Equal to metallic iron 49·62 per cent.	
46	Brown hematite	Brown's Creek, near Blayney.
47	,,	,,
48	,,	Portion 29, parish of Calvert, Brown's Creek, near Blayney.
49	Brown hematite	Near Mudgee.
50	,,	Pine Ridge, Talbragar.
51	,,	Gulgong.
52	Red hematite	,,
53	Limonite	Near Dubbo.
54	,,	,,
55	,,	Drake, New England.
	Analysis.	
	Metallic iron..... 61·94 per cent.	
56	Red hematite (concretionary)	Stony Creek, Tingha.
57	Brown hematite (concretionary)	,, ,,
58	,,	Cliefden, near Lyndhurst.
59	,,	Newstead, near Inverell.
60	Limonite	Balaclava Ironstone and Copper Mine, Barrier Range.
61	,,	,, ,, ,,
62	Specular iron	,, ,, ,,
63	,,	,, ,, ,,
64	,,	Tarago, near Goulburn.
65	Magnetite	Tallawang, near Gulgong.
66	,,	Glasson's property, Brown's Creek, near Blayney.
67	,,	
68	,,	,, ,, ,,
69	,,	Broula, Cowra district.
70	,,	,, ,,
71	,,	Young.
	Analysis.	
	Metallic iron..... 66·34 per cent.	
	Silica ..... 2·06 ,,	
72	Magnetite	Parish of Balmoral, county of Durham.
73	,,	Near Clarence Town.
	Analysis.	
	Metallic iron..... 38·40 per cent.	
	Silica ..... 14·45 ,,	
	Titanic acid ..... 12·55 ,,	
74	Chromite	Peel River, Nundle.
75	,,	8 miles from Tamworth.
76	,,	Peel River, Nundle.
77	,,	Bingara.

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.—Iron, Manganese, &c.

Minister for Mines and Agriculture, Sydney.—Collection of Iron, Manganese, &c.—*continued.*

No.	Description.	Locality.
78	Chromite	Parish of Pucka, Clarence River.
	Analysis. Sesquioxide of chromium...41·99 per cent.	
79	Chromite	Near Oakey Creek.
80	,, ...	Giant's Den, Bendemeer.
81	,, ...	Bland, near Young.
82	,, ...	Near Coolac, Gundagai district.
83	,, ...	,, ,, ,,
84	Oxide of manganese	Bendemeer.
85	,, ,, ...	,,
86	,, ,, ...	,,
87	,, ,, ...	5 miles from Tamworth.
88	,, ,, ...	,, ,,
89	,, ,, ...	Dorry's Scrub, 50 miles from South Grafton.
90	,, ,, ...	Near Woodstock.
91	,, ,, ...	Young.
92	,, ,, ...	5 miles from Rockley.
93	,, ,, ...	Near Wellington.
94	Cobaltiferous manganese	Bungonia.
95	,, ,, ...	Windellama, on the Shoalhaven River.
	Analysis. Peroxide of cobalt ... 1·90 per cent.	
96	Cobaltiferous manganese	Bungonia.
97	,, ,, ...	,,
98	,, ,, ...	,,
99	Rhodonite	Bendemeer.
100	,, ...	Glanmire, near Bathurst.
101	Arsenide of cobalt	Carcoar.

960. Brown Hematite Iron Ore, with pig iron from the Fitzroy Iron Mines, Mittagong.

Mr. C. S. Wilkinson, late Government Geologist, describes the deposit from which this exhibit was taken as having been "formed from ferruginous springs, some of which are still flowing and depositing hydrous iron oxide. The ore varies from hard, compact, brown hematite to soft, ochreous material, and yields on analysis from 47·2 to 61·397 of metallic iron."

The following analyses made by the Analyst of the Department of Mines will show the composition of the ore:—

	(1.)	(2.)	(3.) Calcined.
Combined water	10·80	12·00	.....
*Iron peroxide	80·00	81·25	72·00
,, protoxide	.....	.....	14·14
Manganese protoxide	3·40	.....	1·00
Alumina	4·40	3·45	11·20
Silica	.....	3·20	.....
Magnesia	.....	.....	1·12
Lime	1·00	.....	traces
Phosphoric oxide	.....	.....	.....
Sulphur	.....	minute traces	.....
Insoluble in acids	.....	.....	.....
Loss, undetermined, &c.	.....	0·10	.....
	99·60	100·00	99·46
* Equal to metallic iron	56·00	56·75	61·39

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.—Iron, Manganese, &c.

961. Brown Iron Ore from M. B. Gilkrest's Portion 29, Parish of Calvert, County of Bathurst.

This iron ore deposit, which occurs in diorite, is lenticular in form, and probably owes its origin to a chalybeate spring. It occupies an area of several acres, so far as can at present be judged, prospecting operations being confined to a few small openings made in winning ore for smelting at Lithgow some years since, to which place it was conveyed by teams to Blayney Railway Station—about 6 miles—thence by rail to the Lithgow Smelting Works.

The deposit is on the bank of Brown's or Cowriga Creek, and in close proximity to limestone.

The following is an analysis of an average sample :—

Moisture at 100° C.	1·02
Combined water	10·74
Iron peroxide	72·36*
,, protoxide	nil
Manganese protoxide	trace
Silica	10·20
Alumina	3·94
Lime	1·35
Magnesia	·86
Phosphoric anhydride	nil
Sulphur trioxide	,,
Carbonic acid	,,
	100·47

Specific gravity, 3·602.

* Equal to 50·65 per cent. of metallic iron.

962. Magnetic Iron Ore from H. Glasson, Sen.'s Portion 8, Parish of Errol, County of Bathurst, about 4½ miles from Blayney Railway Station.

The deposit from which this ore was taken occurs in diorite, and is closely associated with a chalcedonic quartz reef. A cutting made whilst obtaining ore for the Lithgow Iron-smelting Works revealed a solid face of ore about 30 ft. by 15 ft.; about 10 chains to the westward several smaller openings have been made in similar ore. The ore is strongly magnetic, and forms a natural loadstone.

The following analysis reveals its character :—

Water lost at 100° C. / Combined water	0·13
Iron peroxide	60·48*
,, protoxide	18·67*
Manganese protoxide	nil
Zinc and nickel	,,
Alumina	14·22
Silica	6·50
Magnesia	nil
Lime	,,
Carbonic acid	,,
Phosphoric acid	,,
Sulphur	,,
	100·00

* Equal to 56·85 per cent. of metallic iron.

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.—Iron, Manganese, &c.

963. Brown Iron Ore from George Hayton's Newbridge Iron Mine, a quarter of a mile from the Newbridge Railway Station, Great Western Railway Line, and 164 miles west from Sydney.

A considerable quantity of this ore was used during smelting operations at Lithgow, in the winning of which an opening about 2 chains long by about 1 chain wide was made, revealing an irregular bunch of rich brown iron ore, occurring in talcose schist; the workings had reached a depth of about 30 ft. when smelting at Lithgow was discontinued.

An average sample gave the following results on analysis:—

Moisture at 100° C.	2·83
Combined water	10·10
Iron peroxide	79·76*
,, protoxide	trace
Manganese protoxide	,,
Silica	2·72
Alumina	3·62
Lime	nil.
Magnesia	·54
Phosphoric anhydride	nil
Sulphur trioxide	,,
Carbonic acid	,,
	99·57

Specific gravity, 3·625.

* Equal to 55·84 per cent. of metallic iron.

964. Magnetic Iron Ore, from Messrs. Breckenridge and Watson's Estate, Port Stephens.

965. Chrome Iron Ore, Bowling Alley Point, Near Nundle.

966. Manganese Ore, Bendemeer.

967. Manganese Oxide, from near Woodstock.

968. ROTHERY, W. M., Cliefden, near Lyndhurst.

Brown Iron Ore from near the Cliefden Homestead, and about 4½ miles from the Myalla Railway Siding, on the Blayney to Cowra Railway Line, at a distance of about 188 miles by rail from Sydney.

This ore was taken from a large unprospected outcrop extending for about ½ mile, with a width of from 2 to 3 chains, in limestone.

An average sample of the brown iron ore taken from the surface yielded as follows:—

Moisture at 100° C.	·43
Combined water	11·15
Iron peroxide	82·95*
,, protoxide	trace
Manganese protoxide	·08
Copper	trace
Silica	2·45
Alumina	2·10
Lime	·34
Magnesia	nil
Phosphoric anhydride	,,
Sulphur trioxide	,,
Carbonic acid	,,
	99·50

Specific gravity, 3·998.

* Equal to 58·06 per cent. of metallic iron.

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.—Iron, Manganese, &c.

969. STATHAM, H. W., Sydney.

Iron Ore from Lyndhurst, County of Bathurst.

The Lyndhurst Iron Mine is situated 190 miles from Sydney, on a branch of the Great Western Railway, and 178 miles from Granville, where extensive iron and machinery works are situated, also the Clyde Smelting Works, in which the Lyndhurst ironstone was used as a flux in the smelting of silver ores. The mine is also about 90 miles from Lithgow, the seat of the Western Iron Mills, Copper Refinery, and Pottery Works.

In this mine are three lodes—2 ft., 35 ft., and 40 ft. wide respectively—and though it has only been prospected to a few feet in depth, yet a large amount of ore is in sight.

970. CARCOAR COBALT COMPANY, Carcoar.

Cobalt Ore (arsenide), about ¾ mile from Carcoar Railway Station.

Analysis.—No. 1.

Moisture	·120
Metallic arsenic	51·810
,, cobalt	10·447
,, nickel	·590
,, iron	11·860
,, manganese	nil
,, calcium	,,
Magnesium	1·480
Gold	trace
Silver	,,
Sulphur	1·520
Gangue (insoluble in acids)	22·078
	99·905

Specific gravity, 5·43.

No. 2.

Moisture	2·180
Metallic arsenic	29·010
,, cobalt	13·830
,, nickel	·390
,, iron	15·78
Alumina	trace
Manganese	nil
Calcium	·71
Magnesium	·22
Sulphur	11·24
Gangue	26·31
	99·66

Traces of gold; no silver; trace of copper and antimony.

The ore consists of glaucodot (a variety of cobaltiferous mispickel), erythrine (cobalt bloom), molybdenite, and thin films of arsenate of nickel.

Mr. Geological Surveyor David (Annual Report, Department of Mines, 1888) states that: "This deposit of cobalt appears to me to have been formed in a line of fissure, which for some distance followed the line of junction of the diorite with the slate, and was probably directly due to the intrusion of the diorite, being formed either by the thrust of its upheaval, or by the contraction consequent upon the cooling of the mass of igneous rock. Towards its north-east end this fissure was partly filled by a dyke of fine-grained diorite, closely resembling the chlorite slate, which it has penetrated. The cobalt ore was then concentrated into the irregular hollows along this line of fissure by some process of segregation, for its intimate admixture with the dyke rock is difficult of explanation on any other hypothesis, and in the case of No. 2 and No. 3 bunches, by a similar process, accompanied, apparently, by a slight transportation of the mineral in solution into the hollows now occupied by the bunches, as in these two last cases the gradual merging of the mineral into the country rock is less apparent than in the first."

DIAMONDS AND OTHER GEMS.

Diamond mining in New South Wales is likely to become of much importanee.

Fifty thousand diamonds have been obtained up to the present time, chiefly from the Tertiary gravels and recent drifts in the Bingera, Inverell, and Cudgegong districts, besides a few from the neighbourhood of Mittagong, Wellington, Uralla, and Coolah.

The principal minerals associated with the diamonds are gold, garnets, wood-tin, brookite, magnetite, ilmenite, tourmaline, zircon, sapphire, ruby, adamantine spar, barklyite, common corundum, and a peculiar lavender-coloured variety of quartz, topaz, magnesite, and nodules of limonite.

The largest diamond weighed 16·2 grains, or about 5⅛ carats.

A diamond from Bingera, used in one of the Government diamond drills, bored 1,267 feet through sandstone and conglomerate without fracture.

Samples of the diamonds and of the drift in which they occur are exhibited.

MINISTER FOR MINES & AGRICULTURE, Sydney.

971. 20 carats Diamonds, from the Round Mount Diamond Mine, near Inverell.

Diamondiferous drift, with diamonds and associated gems, &c., from Round Mount Diamond Mine, Parish of Aconite, Auburn Vale, near Inverell. Area, 150 acres. Thickness of drift, from 3 to 5 feet. Forty loads of wash yielded 1,500 diamonds, weighing 500 carats; seven loads of wash yielded 408 diamonds, weighing 101 carats.

972. Tin and diamondiferous wash, &c., from the Malacca Diamond and Tin-mining Company's property, Alburn Vale, Inverell. 2,650 carats of diamonds and 8¾ tons of tin have been obtained by the present Company up to 1st May, 1890.

973. Diamonds, diamondiferous wash, and associated minerals from the Monte Christo Mine, Bingera.

974. Emeralds (cut) with matrix showing associated minerals, from the New Emerald Proprietary Mining Company's property, near Emmaville. (Purchased by the New South Wales Commission).

The Emerald Mine is situated 7 miles N. by E. from Emmaville and 16 miles from the Deepwater Railway Station, the latter being 445 miles from Sydney, on the Great Northern Railway. The emeralds occur in bunches and shoots in a vein of quartz and topaz rock traversing claystone near its junction with intrusive granite. The associated minerals are largely topaz, fluorspar, eassiterite, and mispiekel.

MACKENZIE BROTHERS, White Cliffs, via Wilcannia.

975. Opals, from White Cliffs.

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.—Fossils.

976. MINISTER FOR MINES & AGRICULTURE, Sydney.

Collection of Characteristic Fossils from the principal Sedimentary Formations of New South Wales. Prepared under the direction of E. F. Pittman, F.G.S., Government Geologist.

No.	Description.	Locality.
	FORMATION—UPPER SILURIAN.	
	Class—Actinozoa.	
1	Favosites gothlandica	Yass.
2	„ „	Hatton's Corner, Yass.
3	„ „	„ „
4	„ „	„ „
5	„ „	„ „
6	Heliolites	Wellington.
7	Pachypora	Tarago.
8	Ptycophyllum	Hatton's Corner, Yass.
9	Rugose corals	Quedong.
10	Compound cyathophylloid coral	Limestone Creek, Yass.
11	Tryplasma Lonsdalei	Hatton's Corner, Yass.
12	Syringopora	Yass.
13	Cyathophylloid corals	Hatton's Corner, Yass.
14	„ „	„ „
	Class—Echinodermata.	
	Order—Crinoidea.	
15	Crinoid stems	Quedong, near Bombala.
16	„	Hatton's Corner, Yass.
	Class—Polyzoa.	
17	Glauconome, sp.	Bowning.
	Classes—Brachiopoda and Lamellibranchiata.	
18	Rhynconella and pygidium of Enerinnrus	Quedong, near Bombala.
19	Spirifera, allied to S. yassensis and Chonetes	„ „
20	Pterinea, sp.	„ „
21	Spirifera, allied to S. plicatella	„ „
22	„ „	Bowning.
23	Meristella, or Whitfieldia (?)	Yass.
24	Pentamerus, allied to P. Knightii	Quedong, near Bombala.
25	„ „	„ „
26	„ „	Flyer's Creek, Forest Reefs.
27	Leptæna	Quedong, near Bombala.
28	„	„ „
29	Orthis elegantula (?)	Racecourse, Yass.
30	Anodontopsis anstralis, and Chonetes	Quedong, near Bombala.
31	Pentamerus lingnifer, var.	Bowning.
32	„ „ and Phacops	„
33	„ Knightii	Quedong.
34	Orthis, near O. porcata	„
35	Pterinea (?), sp.	Below bridge, Yass.
	Class—Gasteropoda.	
36	Enomphalus Clarkei	Yass.
37	„ „	Bowning.
38	Holopea and Rhynchonella	Wellington Caves, Limestone.
39	Worthenia, sp.	„ „
40	„	„ „
41	Holopea, sp.	„ „

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.—Fossils.

Minister for Mines and Agriculture, Sydney.—Collection of Characteristic Fossils, &c.—*continued.*

No.	Description.	Locality.
	CLASS—CEPHALOPODA.	
42	Section of Orthoceras, sp.	Quedong, near Bombala.
	CLASS—CRUSTACEA.	
44	Enerinurus	Bowning.
45	,,	,,
46	,,	,,
47	,,	,,
48	,,	,,
49	,,	,,
50	,,	,,
51	Phacops, probably P. caudatus	,,
52	,, ,, ,,	,,
53	,, ,, ,,	,,
54	,, ,, ,,	,,
55	,, ,, ,,	,,
56	,, ,, ,,	Limestone Creek, Yass.
57	,, ,, ,,	Yass.
58	,, ,, ,,	,,
59	,, ,, ,,	Bowning.
60	,, ,, ,,	Limestone Creek, Yass.
61	,, ,, ,,	Bowning.
62	,, ,, ,,	Limestone Creek, Yass.
63	,, ,, ,,	,, ,,
64	,, ,, ,,	,, ,,
65	,, ,, ,,	,, ,,
66	,, ,, ,,	,, ,,
67	,, ,, ,,	,, ,,
68	Calymene, allied to C. Blumenbaehii	Bowning.
69	,, ,, ,,	,,
70	,, ,, ,,	,,
71	,, ,, ,,	Yass.
72	,, ,, ,,	Bowning.
73	Phacops, probably P. caudatus	Limestone Creek, Yass.
74	Enerinurus (?), sp.	Bowning.
75	Cheirurus, sp.	,,
	DEVONIAN. *(Marine Series.)*	
	CLASS—BRACHIOPODA.	
76	Rhynchonella pleurodon	Solfala District.
77	,, and Spirifera disjuncta, var	Mount Lambie.
78	,, ,, ,,	,,
79	,,	Solfala District.
80	Spirifera disjuncta, var. and Rhynchonella	Mount Lambie.
81	,, ,, ,,	,,
82	,, ,, ,,	,,
	CARBONIFEROUS. PLANTÆ.	
83	Lepidodendron australe	Goonoo Goonoo, near Tamworth.
84	,, ,,	,, ,, ,,
85	,, ,,	,, ,, ,,
86	Plant remains	8 miles from Tamworth.
87	Lepidodendron australe	Near Tamworth.
88	,, ,,	Goonoo Goonoo, Tamworth.
89	,, ,,	8 miles from Tamworth.
90	,, ,,	Goonoo Goonoo, Tamworth.
91	,, ,,	8 miles from Tamworth.
92	,, ,,	Doc'or's Creek, Bingera.

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.—Fossils, &c.

Minister for Mines and Agriculture, Sydney.—Collection of Characteristic Fossils, &c.—*continued.*

No.	Description.	Locality.
	PERMO-CARBONIFEROUS.	
	Classes—Actinozoa and Polyzoa.	
93	Stenopora crinita	Singleton.
94	Zaphrentis Culleni	Rouchel Brook.
95	Trachypora Wilkinsoni	Mount Vincent.
96	Protorepora ampla, Fenestella, &c.	West Maitland.
97	Fenestella	,,
98	,, Morrissii	Pallal, Bingera.
99	,, fossula	Hunter River District.
	Class—Brachiopoda.	
100	Productus, Dielasma, &c.	Somerton.
101	Chonetes, Dielasma, Sacculum, Orthoceras, Loxonema, &c.	,,
102	Productus, and Orthis resupinata	,,
103	,,	,,
104	,, sp.	,,
105	,, ,,	,,
106	,, and Spirifera	Pallal, near Bingera.
107	,, sp.	,, ,,
108	,,	,, ,,
109	,,	,, ,,
110	Spirifera, Dielasma, Productus, &c.	,, ,,
111	Strophalosia (?)	Boorook, New England.
112	Productus brachythærus, Protoretepora	Wollongong.
113	,, and plate of calyx of Tribrachyocrinus Clarkei.	,,
114	Productus brachythærus	,,
115	Spirifera oviformis	Greta.
116	,, convoluta	,,
117	,, Strzeleckii	,,
118	,, ,,	,,
119	,, ,,	,,
120	Spirifera	,,
121	Martinia (internal cast)	,,
122	,, Darwinii	,,
123	Dielasma sacculum	,,
	Class—Lamellibranchiata.	
124	Aviculopecten illawarrensis	Wollongong.
125	,, ,,	Greta.
126	,, ,,	Ravensfield.
127	Aviculopecten	Near Carroll.
128	,, (?)	,,
129	Aviculopecten	Rutherford, near Farley.
130	Aphanaia gigantea	Nowra.
131	Mæonia grandis (?)	Wollongong.
132	Allorisma curvatu m	,,
133	Eurydesma cordata	Harpur's Hill.
134	Allorisma, or Sanguinolites	West Maitland.
135	Mæonia carinata	Wollongong.
136	Edmondia nobilissima, and Goniatites mieromphalus.	Ravensfield.
137	Eurydesma (internal cast)	,,
138	Pachydomus, sp.	West of Farley Railway Station.

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.—Fossils, &c.

Minister for Mines and Agriculture, Sydney.—Collection of Characteristic Fossils, &c.—*continued.*

No.	Description.	Locality.
	CLASS—LAMELLIBRANCHIATA—*continued.*	
139	Mæonia carinata	Greta.
140	Chænomya (?)	,,
141	Sanguinolites Etheridgei	West Maitland.
142	,, ,,	,,
143	,, ,,	,,
145	Cardiomorpha (?)	Stony Creek, near Farley.
146	Pleurophorus	,, ,,
147	Pterinea macroptera	Greta.
148	Pleurophorus (?)	Stony Creek ,,
	CLASSES—GASTEROPODA AND PTEROPODA.	
149	Platyschisma oculum	Harpur's Hill.
150	,,	,,
151	,, rotundatum	Stony Creek, Farley.
152	,,	Farley.
153	Platyschisma (internal cast)	
154	Loxonema	Near Carroll.
155	Macrochielus, and Euomphalus	,,
156	Loxonema, &c.	,,
157	Conularia inornata	Greta.
158	,, ,,	,,
	CLASS—CEPHALOPODA.	
159	Lituites (?) (cast)	Carroll.
160	Cephalopod	,,
161	,,	,,
162	,,	,,
163	Orthoceras	Ravensfield.
164	,,	Near Carroll.
165	,,	Ravensfield.
166	,, martinianum	West Maitland.
167	Goniatites micromphalus	Ravensfield.
	LOWER COAL MEASURES.	
	CLASS—PLANTÆ.	
168	Glossopteris Browniana and vars.	Campbell's Hill, West Maitland.
169	,,	,, ,,
170	,,	,, ,,
171	,,	,, ,,
172	,,	,, ,,
173	,,	Greta.
174	,, and Sphenopteris	Leconfield, near Greta.
175	,,	,, ,,
	MIDDLE COAL MEASURES.	
	CLASS—PLANTÆ.	
176	Glossopteris, sp., in sandstone	East Maitland.
177	,, Browniana	,,
178	,, ,,	,,
179	,, ,,	,,
180	,, ampla	Gulgong.
181 to 186	,, Browniana	,, and Maitland.

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.—Fossils, &c.

Minister for Mines and Agriculture, Sydney.—Collection of Characteristic Fossils, &c.—*continued.*

No.	Description.	Locality.
	UPPER MARINE BEDS.	
	Class—Brachiopoda.	
187	Productus brachythærus and productus spines	Greta.
	Spirifera vespertilio...	,,
188	Productus brachythærus and Spirifera.....	,,
189	Spirifera Strzeleckii	,,
190	Martinia subradiata.....	,,
191	Martinia	
192	Spirifera Strzeleckii and tasmaniensis	Greta.
193	,, ,, ...	,,
194	,, ,, ...	,,
195	,, ,, ...	,,
196	,, tasmaniensis	,,
197	,, ...	,,
198	,, ...	,,
	Class—Lamellibranchiata and Polyzoa.	
199	Mæonia (?)	Greta.
200	Sanguinolites Mitchelli	,,
201	Fenestella, sp.	,,
202	Eurydesma cordata.....	,,
	Class—Gasteropoda.	
203	Platyschisma oculum	Greta.
204	,, ...	,,
205	,, ...	,,
	UPPER COAL MEASURES.	
	Class—Plantæ.	
206	Glossopteris Browniana	Nobby's, Newcastle.
	,, and lincaris.....	,, ,,
207	,, Browniana and vars.....	Bowenfels.
208	,, linearis	West Maitland.
209	,, ampla (?)	Nobby's, Newcastle.
210	,, ,, ...	,, ,,
211	,, Browniana	
212	,, ,, and lincaris.....	,, ,,
213	,, ,, ...	,, ,,
214	,, ,, ...	,, ,,
215	,, ,, ...	,, ,,
216	,, ,, ...	Lithgow.
217	,, ampla	Wollongong.
218	Glossopteris Browniana and Sphenopteris alata.	Nobby's, Newcastle.
219	Glossopteris Browniana	,, ,,
220	Sphenopteris alata	,, ,,
221	Glossopteris.....	,, ,,
222	Phyllotheca australis and Glossopteris	,, ,,
223	,, ,, ...	,, ,,
224	,, ,, ...	,, ,,
225	,, ,, ...	,, ,,
226	,, ,, (leaf whorls)	,, ,,
227	,, ,, ...	,, ,,
228	,, ,, ...	,, ,,
229	Vertebraria australis	Waratah Coal Mine, Raspberry Gully, Newcastle District.
230	,, ,, ...	,, ,,
231	,, ,, ...	,, ,,

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.—Fossils, &c.

Minister for Mines and Agriculture, Sydney.—Collection of Characteristic Fossils, &c.—*continued.*

No.	Description.	Locality.
	CLASS—PLANTÆ—*continued.*	
232	Vertebraria australis	Waratah Coal Mine, Raspberry Gully, Newcastle District.
233	„ „	„ „
234	Brachyphyllum australe	Bowenfels.
235	„ „	„
	MESOZOIC.	
	Hawkesbury Series.	
236	Myriolep's	Gosford.
237	Pristisomus gracilis	„
238	Semionotus (?)	„
239	Apateolepis	„
240	Dictyopyge symmetrica	„
241	Apateolepis australis, and Pristisomus	„
242	Cleithrolepis and Apateolepis (?)	„
243	„ granulatus and Pristisomus	„
244	Gosfordia truncata	„
245	Cleithrolepis granulatus	„
246	Gosfordia truncata	„
247	Dictyopyge	„
248	Pristisomus latus	„
249	Apateolepsis and Pristisomus gracilis or P. latus	„
250	Pristisomus latus	„
251	„ „	„
252	„ „ &c.	„
253	Cleithrolepis granulatus	„
254	„ „	„
255	Pristisomus latus	„
256	„ „	„
257	„ crassus	„
258	Gosfordia truncata	„
259	Pristisomus gracilis	„
260	„ „	„
261	„ „	„
263	„ „	„
264	Peltopleurus dubius	„
265	Belonorhynchus gracilis, Dictyopyge, and Cleithrolepis granulatus.	„ „
	Clarence and Narrabeen Series.	
266	Thinnfeldia odontopteroides	Clarence River District.
267	„	„ „
268	„	3 miles south of Barrenjuey Lighthouse.
	Hawkesbury Series.	
268A	Thinnfeldia odontopteroides	Mt. Piddington, Mt. Victoria.
268B	„	„
268C	„	„
	(*Wianamatta Series.*)	
269	Unio Wianamattensis	Goodlet & Smith's Quarry, Waterloo
270	„ and Unio Dunstani	Bowral.
271	„	Waterloo.
272	Unio Dunstani	Luddenham.
273	„	„
274	Zeugophyllites (?)	Auburn.
275	„	„

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.—Fossils, &c.

Minister for Mines and Agriculture, Sydney.—Collection of Characteristic Fossils, &c.—*continued.*

No.	Description.	Locality.
	(Talbragar Fish and Plant Beds.)	
276 to 299	Fish and Plants (chiefly Tæniopteris Daintreei).	Talbragar River.
	CRETACEOUS.	
300	Shell agglomerate	Mount Wilson Well.
301	Maccoyella reflecta	Mount Brown.
302	„ „	„ „
303	„ „	Milparinka.
304	Cretaceous strata, showing shells	Bore B 3, Bourke.
305	„ „	Bourke.
	EOCENE.	
	PLANTÆ.	
306	Alnus M'Coyi	Vegetable Creek.
307	Anozamites Muellerii	„
308	Artocarpidium Gregorii	„
302	Banisteriophyllum, sp.	„
310	Cinnamomum Leichhardtii	Elsmore.
311	„ polymorphoides	Newstead, near Inverell.
312	Ceratopetalum MeDonaldi	Vegetable Creek.
313	Diemenia speciosa	Elsmore.
314	„ persæfolia	„
315	Dammara podozamites	Vegetable Creek.
316	Eucalyptus Mitchelli	„
317	Fagus Benthami	Elsmore.
318	„ Muelleri	Vegetable Creek.
319	Lomatia Goyderi	„
320	„ Brownii	Strathbogie, near Vegetable Creek.
321	Laurus australiensis	Newstead.
322	Poacites australis	Vegetable Creek.
323	Quercus Darwinii	„
324	Rhopala sapindifolia	„
325	Sequoia australiensis	„
326	„ „	„
327	Sapotacites Forresti	„
328 to 330	Slabs showing Quercus, Cinnamomum, &c.	„
331 to 343	Miscellaneous, Cinnamomum	Dalton.
344	„ „	Newstead.
345	„ „	Dalton.
346	„ „	Newstead.
347	„ „	Bega.
348	„	Newstead.
	PLIOCENE.	
	PLANTÆ.	
349	Phymatocaryon Mackayi	Forrest Reefs.
350	Penteune Clarkei	„
351	Spondylostrobus Smythii	„
352	Rhytidocaryon Wilkinsoni	„

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.—Fossils, &c.

Minister for Mines and Agriculture, Sydney.—Collection of Characteristic Fossils, &c.—*continued.*

No.	Description.	Locality.
	PLEISTOCENE.	
	MARSUPIALA.	
353	Macropus, portion of lower jaw	From Post-tertiary ossiferous clays, near Myall Creek, Bingera.
354	,, ,,	,,
355	,, molars	,,
356	,, incisors	,,
357	,, toe bones	,,
358	,, ,,	,,
359	Thylacoleo (base of skull)	Wellington Caves.
360	,, front portion of lower jaw, showing carnassial tooth, molar, and portion of front incisor	,,
361	Thylacoleo, portion of left jaw, showing molars	,,
362	,, lower front incisor	,,
363	Thylacinus, major portion of right lower mandible, with molars	,,
364	Thylacinus, portion of upper jaw, with molars	,,
365	,, molars	,,
366	Sarcophilus ursinus, front portion of upper jaw, with incisors	,,
367	Lower jaw of small carnivora	,,
368	Upper ,, ,, ,,	,,
369	Macropus (skull)	,,
370	,, ,,	,,
371	,, ,,	,,
372	,, right lower mandibles	,,
373	,, ,, ,,	,,
374	,, left ,, ,,	,,
375	,, right ,, ,,	,,
376	,, portion of upper jaw	,,
377	,, ,, ,,	,,
378	,, molar	,,
379	,, front incisors	,,
380	,, ,,	,,
381	,, ,,	,,
382	Skull and jaws of small marsupials	,,
383	Phascolomys, portion of upper jaw	,,
384	Jaws of small rodent (Mus.)	,,
385	Phascolomys, front incisors	,,
386	Left femur of marsupial	,,
387	,, ,,	,,
388	,, ,,	,,
389	Right femur of ,,	,,
390	,, ,,	,,
391	Left humerus of ,,	,,
392	Right ,, ,,	,,
393	Tibia of Macropus	,,
394	,, ,,	,,
395	,, ,,	,,
396	,, ,,	,,
397	Pelvic bones of Macropus	,,
398	,, ,,	,,
399	,, ,,	,,
400	,, ,,	,,
401	,, ,,	,,

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 230 and 231: Collections of Minerals, Ores, &c.—Fossils, &c.

Minister for Mines and Agriculture, Sydney.—Collection of Characteristic Fossils, &c.—*continued.*

No.	Description.	Locality.
	MARSUPIALA—*continued.*	
402	Pelvic bones of Macropus	Wellington Caves.
403	Marsupial femur	,,
404	,,	,,
405	Right and left femur of marsupial	,,
406	Metatarsal bones of Macropus	,,
407	,, ,,	,,
408	,, ,,	,,
409	,, ,,	,,
410	Ribs of Macropus	,,
411	,, ,,	,,
412	,, ,,	,,
413	Sacrum of marsupial	,,
414	,, ,,	,,
415	,, ,,	,,
416	,, ,,	,,
417	Caudal vertebræ of marsupial	,,
418	,, ,,	,,
419	Ferruginous bone breccia	,,
420	Calcareous ,,	,,
421	,, ,,	,,
422 to 435	Diprotodon australis (portion of lower jaw)	From Post-tertiary ossiferous clays, near Myall Creek, Bingera.
436	,, ,, ,, upper ,,	
437	,, ,, ,, ,, ,,	
438 to 444	,, incisors	
445	,, large molars	
446	,, ,,	
447	,, fragmentary molars	
448	,, worn portion of molar	
449	,, or Nototherium (sacrum)	
450	,, ,, portion of vertebræ	
451	,, ,, ,,	
452	,, ,, ,,	
453	,, ,, portion of ribs	
454	,,	
455	,, ,, ,,	
456 to 458	,, ,, foot bones	
459	Nototherium, portion of lower jaw	
460	,, fragments of jaw with incisors	
461	,, ,, ,,	
462	,, front incisors	
463	,, ,,	
464	,, ,,	
465	,, fragments of incisors	
466	Phascolomys, portion of jaw with molars in situ	
467 to 472	Blackfellow's stone hatchets	New South Wales.

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.

977. HORTON, T., junr., Fairfield, Drake.

Collection of Minerals from New England, New South Wales.

No.	Description.	Locality.
1	Auriferous quartz with sulphides of copper and iron. Assay—gold, 1 oz. 3 dwt.; silver, 3 oz. per ton.	Adelene Gold-mine, Fairfield
2	,, quartz gossan. Assay—gold, 18 dwt. per ton.	Mount Pleasant ,,
3	,, quartz gossan. Assay—gold, 1 oz. 17 dwt. per ton.	Mount Gladstone ,,
4	,, ferruginous quartz	Fairfield
5	,, quartz gossan. Assay—gold, 2 oz.; silver, 3 oz. per ton.	,,
6	,, gossan. Assay—gold, 2 oz. 2 dwt. per ton.	Great Northern Mine, Fairfield
7	,, ferruginous quartz	Fairfield
8	,, concentrates, from pyritous porphyry. Assay—gold, 3 oz.; silver, 27 oz. per ton.	,,
9	,, quartz with zinc blende. Assay—gold, 1 oz. 17 dwt. per ton.	Sawpit Gully, Fairfield
10	,, quartz with chessylite. Assay—gold, 15 dwt. per ton.	,, ,,
11	,, quartz.....	Horton's Claim, Sawpit Gully, Fairfield.
12	,, granite with molybdenite. Assay—gold, 2 dwt. 12 gr. per ton.	Poverty Point, Timbarra
13	,, granite	,, ,,
14	,, granite. Assay—gold, 18 dwt. per ton.	,, ,,
15	,, granite, with quartz, showing molybdenite. Assay—gold, 12 dwt. per ton.	,, ,,
16	,, granite. Assay—gold, 7 dwt. per ton.	,, ,,
17	,, granite	,, ,,
18	,, pyritous granite. Assay—gold, 27 oz. per ton; silver, trace.	Timbarra
19	,, pyritous granite. Assay—gold, 12 oz.; silver, 13 oz. per ton.	,,
20	,, granite. Assay—gold, 8 dwt. per ton.	,,
21	,, pyritous granite. Assay—gold, 12 oz.; silver, 27 oz. per ton.	,,
22	,, granite with pyrites and molybdenite. Assay—gold, 1 oz. 17 dwt.; silver, 7 oz. per ton.	,,
23	,, drift granite. Assay—gold, 12 oz. per ton.	,,
24	,, drift granite.....	,,
25	,, ,, ...	,,
26	,, quartz and felspar	,,
27	,, pyritous felspathic lode stuff.....	,,
28	,, gossan resulting from the decomposition of pyrites containing gold.	,,
29	,, pyritous greisen. Assay—gold, 18 dwt.; silver, 15 oz. per ton.	,,

County Drake, New England.

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.

Horton, T., jun., Fairfield, Drake.—Collection of Minerals, &c.—*continued.*

No.	Description.	Locality.	
30	Auriferous decomposing iron pyrites	Poverty Point, Timbarra	New England.
31	„ gossan (result of decomposed pyrites).	„ „	
32	„ quartz containing gold	„ „	
33	„ quartz with limonite after pyrites. Assay—gold, 1 oz. 13 dwt. per ton.	Solferino	
34	„ quartz and pyrites	Lion Reef, Solferino	
35	„ pyrites in magnetite	Solferino	
36	„ secondary iron pyrites. Assay—gold, 3 oz. 3 dwt. per ton.	„	
37	„ quartz with native copper. Assay—gold, 57 oz. per ton.	Lunatic Reef, Lunatic	
38	„ mispickel in calcite	Lunatic	
39	„ stibnite	„	
40	„ metallic arsenic. Assay—gold, 97 oz. per ton.	„	
41	„ cervantite and stibnite. Assay—gold, 3 oz. 12 dwt. per ton.	Pretty Gully, Lunatic	
42	„ quartz in slate breccia. Assay—gold, 1 oz. 17 dwt per ton.	„ „	
43	„ quartz with zinc blende, copper, and iron pyrites. Assay—gold, 7 oz. 9 dwt. per ton.	Long Gully, Lunatic	
44	„ gossan, resulting from the decomposition of arsenical pyrites. Assay—gold, 3 oz. 12 dwt.; silver, 9 dwt. per ton.	Clarence River	
45	„ gossan	Black Rock, Richmond River	
46	„ quartz vein. Assay—gold, 9 oz per ton.	Mount Pleasant	
47	„ stibnite. Assay—gold, 1 oz. 19 dwt. per ton.	Eleanora Mine, Hillgrove, near Armidale	
48	„ quartz vein and slate showing gold	Baker's Creek, Hillgrove, near Armidale	
49	Rich silver ore (sulphide of silver)	Boorook, county Buller	
50	Argentiferous quartz and iron pyrites. Assay—silver, 74 oz. per ton.	„ „	
51	„ quartz veinstone. Assay—silver, 79 oz. per ton.	Golden Crown, Boorook, county Buller	
52	„ zinc blende, in altered slate. Assay—silver, 79 oz. per ton.	Deepwater, county Gough	
53	„ lode stuff with carbonate of copper. Assay—silver, 176 oz. per ton.	Gilligan's Claim, Deepwater, county Gough	
54	„ gossan and galena. Assay—silver, 43 oz. per ton.	Castle Mine, Deepwater, county Gough	
55	„ quartz, galena, and zinc blende. Assay—silver, 68 oz. per ton.	Burra Burra, Pye's Creek, county Clive	
56	„ zinc blende. Assay—silver, 17 oz. per ton.	Pye's Creek, county Clive	
57	„ brecciated quartz, blende, and stibnite. Assay—silver, 49 oz. per ton.	Caledonian Mine, Pye's Creek, county Clive	
58	„ galena and blende. Assay—silver, 156 oz. per ton.	Pye's Creek, county Clive	

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.

Horton, T., jun., Fairfield, Drake.—Collection of Minerals, &c.—*continued.*

No.	Description.	Locality.	
59	Argentiferous carbonate of lead. Assay—silver, 92 oz.; lead, 27 per cent. per ton.	Pye's Creek, county Clive	New England.
60	,, gossan. Assay—silver, 63 oz. per ton.	Castle Rag Mine near Deepwater, county Gough	New England.
61	,, pyritous veinstone.....	Fairfield	County Drake, New England.
62	,, quartz and gossan with carbonate of copper. Assay—silver, 83 oz.; gold, 17 dwt. per ton.	Tonkin Mine, Fairfield	County Drake, New England.
63	,, quartz, with pyrites & sulphide of silver. Assay—silver, 153 oz.; gold, 1 oz. 12 dwt. per ton	La Maseotte Mine, Fairfield	County Drake, New England.
64	,, carbonate of lead. Assay—silver, 12 oz; lead, 68 per cent; gold, 3 oz. per ton.	,, ,,	County Drake, New England.
65	,, sulphides of lead and zinc ...	,, ,,	County Drake, New England.
66	,, sulphides of lead and zinc, in quartz.	,, ,,	County Drake, New England.
67	,, quartz. Assay—silver, 9 oz.; gold, 12 dwt. per ton.	Bealey's Lode, ,,	County Drake, New England.
68	,, zinc blende, and galena. Assay—silver, 35 oz.; gold, 12 dwt. per ton.	Sawpit Gully, ,,	County Drake, New England.
69	,, quartz, with galena, blende, pyrites and native silver.	White Rock	County Drake, New England.
70	,, felspathic veinstone, with sulphide of silver.	,,	County Drake, New England.
71	,, crystals of zinc blende, and carbonate of lime, with quartz.	,,	County Drake, New England.
72	,, porphyry with crystals of iron pyrites. Assay—silver, 11 oz. per ton.	,,	County Drake, New England.
73	,, quartz, with zinc blende, galena, and pyrites. Assay—silver, 279 oz. per ton.	,,	County Drake, New England.
74	,, nodule of pyrites. Assay—silver, 17 oz. per ton.	Timbarra	County Drake, New England.
75	,, stibnite. Assay—silver, 11 oz. per ton.	Solferino	County Drake, New England.
76	,, gossan (surface). Assay—silver, 113 oz. per ton.	Wongabah Lode, Rivertree	New England.
77	,, ironstone and carbonate of copper.	,, ,,	New England.
78	,, earthy carbonate of lead. Assay—silver, 29 oz.; lead, 53 per cent. per ton.	,, ,,	New England.
79	,, yellow gossan, with sulphate of lead and zinc. Assay—silver, 37 oz. per ton.	,, ,,	New England.
80	,, clay shale. Assay—silver, 18 oz. per ton.	,, ,,	New England.
81	,, iron pyrites and galena. Assay—silver, 96 oz.; lead, 22 per cent. per ton.	,, ,,	New England.

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.

Horton, T., jun., Fairfield, Drake.—Collection of Minerals, &c.—*continued.*

No.	Description.	Locality.	
82	Argentiferous pyrites, blende, and galena. Assay—silver, 97 oz.; gold, 3 dwt. per ton.	Wongabah Lode, Rivertree	New England.
83	,, quartz, lode-stuff. Assay—silver, 49 oz. per ton.	Silvery Ware, ,,	
84	,, pyrites, with a little zinc blende, and quartz. Assay—silver, 97 oz. per ton.	,, ,,	
85	,, galena. Assay—silver, 35 oz. per ton.	,, ,,	
86	,, quartz, with oxide and carbonate of lead, and chloride of silver.	Korulah Lode, Rivertree	
87	,, spongy quartz, with chloride of silver. Assay—silver, 2,760 oz. per ton.	Light Ruby, ,,	
88	,, gossan lode-stuff, showing silver chlorides.	Thomas Lode, ,,	
89	,, zincblende, and pyrites, in veinstone. Assay — silver, 49 oz. per ton.	Parkes Lode, ,,	
90	,, laminated veinstone. Assay—silver, 42 oz.; gold, 12 dwt. per ton.	,, ,, ,,	
91	,, ferruginous gossan. Assay—silver, 127 oz. per ton.	Rivertree	
92	,, ferruginous gossan	,,	
93	,, jamesonite. Assay — silver, 179 oz. per ton.	,,	
94	,, jamesonite. Assay — silver, 1,360 oz. per ton.	,,	
95	,, fahlerz, galena, blende, and quartz. Assay—silver, 146 oz. per ton.	Webb's Proprietary Silver-mine	
96	,, crystals of mispickel and quartz. Assay—silver, 27 oz. per ton.	Webb's Consols, near Emmaville	
97	,, mispickel in felspathic matrix. Assay—silver, 20 oz. per ton.	,, ,, ,,	
98	,, fluor-spar, with galena	Webb's Proprietary Silver-mine	
99	,, iron pyrites in porphyroid rock. Assay—silver, 87 oz. per ton.	Rockley River	
100	,, basalt scoriæ	Black Rock, Richmond River	
101	,, galena	Red Rock	
102	,, ,, ...	,,	
103	,, talc and quartz. Assay—silver, 38 oz.; gold, 1 oz. 3 dwt. per ton.	Long Gully	
104	,, quartz, with galena, blende, and pyrites. Assay—silver, 237 oz. per ton.	Boonoo Boonoo	
105	.....	.....	
106	Lode tin ore.....	Ottery Creek, Tent Hill	
107	.....	Block 34, ,,	
108	Lode tin ore (100 ft. level)	Ottery Creek ,,	
109	,, ,, ...	Tornado Lode, Emmaville	
110	,, ,, ...	.....	

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.

Horton, T., jun., Fairfield, Drake.—Collection of Minerals, &c.—*continued.*

No.	Description.	Locality.
111	Lode tin ore	Dutchman Lode, Emmaville
112	,,	Clifford's, The Gulf, Emmaville
113	,,	,, ,, ,,
114	,,	Mole Tableland
115	,,	Planet, Nine-mile, Deepwater
116	,,	Ding Dong, Deepwater
117	,,	,, ,,
118	,,	Inverell
119	,,	Free Tunnel
120	,,	Alexander, Emu Creek
121	,,	Lode Creek, Johnson
122	Chloritic tin ore, lode 3 to 4 ft. wide	A'Hern's Claim, half-mile south of S. California.
123	Lode tin ore	Kennedy's Mine, Tenterfield
124	,,	Stanthorpe
125	,, and tourmaline	,,
126	,,	Lode Creek, Stanthorpe
127	,,	,, Emmaville
128	,,	,, ,,
129	Tin cement	,, ,,
130	,,	Rose Valley ,,
131	,,	,, ,,
132	,,	,, ,,
133	Tinstone pebble	,, ,,
134	Stream tin, 72·5 per cent.	,, ,,
135	,,	
136	,,	
137	Tin wash in pipeclay	Rose Valley
138	Chessylite and malachite with blende	Great Northern Mine, Fairfield
139	,,	,, ,, ,,
140	Chessylite, malachite, and pyrites	,, ,, ,,
141	,, ,,	,, ,, ,,
142	Chessylite in quartz	,, ,, ,,
143	Malachite	,, ,, ,,
144	Cuprite	,, ,, ,,
145	Sulphide of copper	Sawpit Gully, Fairfield
146	Oxide and native copper (metallic copper, 22 per cent.)	Great Northern Mine, Fairfield
147	Sulphide of copper	,, ,, ,,
148	,,	,, ,, ,,
149	,,	Sawpit Gully, Fairfield
150	,, and iron	Straw's Mine ,,
151	Chromite	Yulgilba
152	Molybdenite	Timbarra, county Drake
153	,,	,, ,,
154	Oxide of antimony (furnace product)	Eleanora Mine, Hillgrove, Armidale.
155	Granulated sulphide of antimony	,, ,, ,,
156	Coal	Rivertree, Clarence River
157	Graphite	,, ,,
158	,,	,, ,,
159	,, (inferior)	,, ,,
160	Quartz, with pyrites and calcite	Solferino
161	Crystals of quartz and calcite	,,
162	,, ,,	Dutchman, Mole Tableland
163	,, ,,	Lionsville
164	,, ,,	Solferino

New England.

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.—Reef and Alluvial Gold.

Horton, T., jun., Fairfield, Drake.—Collection of Minerals, &c.—*continued.*

No.	Description.	Locality.	
165	Ferruginous quartz crystals	Solferino	New England.
166	„ „	„	
167	Chalcedony	Tooloom	
168	Radiated jasper	Fairfield, County Drake	
169	Garnet	Deepwater	
170	Tourmaline	Fairfield, County Drake	
171	Calcite	Lunatie „	
172	„	Solferino	
173	„	Lunatie, County Drake	
174	Felspar	Timbarra „	
175	Calcareous sinter	Rivertree	
176	Limestone	Fairfield, County Drake	
177			
178	Stalactite		
179 to 184	Carboniferous fossils	Near Boorook	

978. ISAACSOHN, Martin, Nundle.

Reef and Alluvial Gold Specimens.

No.	Exhibitors' List No.	Name.	Locality.
	2H	Specimens of Reef & Alluvial Gold.	Nundle.
	3H		
	1 to 6		
	1A	„ „	
	1B	„ „	
	1C	„ „	
	1D	„ „	
	1E	„ „	
	1F	„ „	
	1G	„ „	
	A	„ „	
	B	„ „	
	C	„ „	
	2A	„ „	Marquis of Lorne Claim, Bowling Alley Point, Peel River, near Nundle.
	2B	„ „	
	2C	„ „	
	2D	„ „	
	2E	„ „	
	2F	„ „	
	2G	„ „	
	108	„ „	
	109	„ „	
	110	„ „	
	111	„ „	
	112	„ „	
	113	„ „	
	119	„ „	

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 230 and 231: Collections of Minerals, Ores, &c.—Reef and Alluvial Gold.

Isaacsohn, Martin, Nundle.—Reef and Alluvial Gold Specimens—*continued.*

No.	Exhibitors' List No.	Name.	Locality.
	36H	Specimens of Reef & Alluvial Gold.	
	37H		
	38H		
	39H	,, ,,	
	40H	,, ,,	Robertson and Westerway's Claim, Bowling Alley Point, Peel River, near Nundle.
	41H	,, ,,	
	42H	,, ,,	
	43H	,, ,,	
	44H	,, ,,	
	45H	,, ,,	
	64 to 68	,, ,,	Guackinaeki Reef, Hanging Rock, Peel River, near Nundle.
	80	,, ,,	
	57 to 61	,, ,,	Black Snake Reef, ,, ,,
	123	,, ,,	
	55	,, ,,	
	56	,, ,,	Golden Streak Claim, ,, ,,
	125	,, ,,	
	50	,, ,,	
	51	,, ,,	Moonlight Reef, ,, ,,
	107	,, ,,	
	106	,, ,,	
	11	,, ,,	
	17	,, ,,	Golden Hole, Bowling Alley Point, ,, ,,
	18	,, ,,	
	118	,, ,,	
	124	,, ,,	
	12 to 16	,, ,,	Foley's Reef, ,, ,, ,,
	94	,, ,,	Foley's Folly, Bowling Alley Point, Peel River, near Nundle.
	100		
	7 to 10	,, ,,	Kansas Reef, Bowling Alley Point, ,, ,,
	19 to 21	,, ,,	Opossum Reef, ,, ,, ,,
	22	,, ,,	Blackfellow's Nob, ,, ,, ,,
	23	,, ,,	Poverty Point, ,, ,, ,,
	24	,, ,,	Phœnix Reef, ,, ,, ,,
	25	,, ,,	
	26	,, ,,	
	27	,, ,,	Duke of Argyle Reef, ,, ,, ,,
	28	,, ,,	
	29	,, ,,	Alliance Reef, Bowling Alley Point, Peel River, near Nundle.
	30	,, ,,	
	31 to 33	,, ,,	Emperor William Reef, ,, ,, ,,
	34	,, ,,	Chamberlain's Reef, ,, ,, ,,
	35	,, ,,	
	36	,, ,,	All Nations Reef ,, ,, ,,
	37	,, ,,	
	38	,, ,,	Price's Hill G. M. Co., ,, ,, ,,
	39	,, ,,	
	40 to 42	,, ,,	Gap Claim, ,, ,, ,,
	120		
	43	,, ,,	Blairmore Mine, ,, ,, ,,
	44	,, ,,	
	45 to 49	,, ,,	Barney's Reef, ,, ,, ,,
	52	,, ,,	Band of Hope Mine, ,, ,, ,,
	53	,, ,,	
	54	,, ,,	Okenvale G. M. Co., ,, ,, ,,
	62	,, ,,	Hanging Rock, near Nundle.
	63	,, ,,	

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.—Reef and Alluvial Gold.

Isaacsohn, Martin, Nundle.—Reef and Alluvial Gold Specimens—*continued.*

No.	Exhibitors' List No.	Name.		Locality.
	69 to 74	Specimens of		We'll Prosper Claim, Foley's Folly, near Nundle.
	75	Reef & Alluvial Gold.		Duke of Edinburgh Claim, ,, ,,
	76			
	77	,, ,,		Berry's Gully, Hanging Rock, ,,
	78	,, ,,		Mountain Maid, ,,
	79	,, ,,		Sperere's Reef, ,,
	81	,, ,,		Missing Link, Dangar's Gully, near Nundle.
	82 to 84	,, ,,		Lady Emma Reef, ,,
	85 to 87	,, ,,		Brunker's Hill, ,,
	88 to 92	,, ,,		Cement Claim, Mount Misery, Peel River, near Nundle.
	H4·101	,, ,,		John Bull Co., Bowling Alley Point, ,, ,,
	102 to 104	,, ,,		Mount Ephraim, ,, ,,
	114	,, ,,		W. Stephen's Claim, Hanging Rock, ,, ,,
	116	,, ,,		Brown Snake Reef, ,, ,,
	117	,, ,,		
	121	,, ,,		Hanging Rock, ,, ,,
	122	,, ,,		
	50H	,, ,,		Henderson & Co., Cement Claim, Mount Pleasant, near Nundle.
	52H	,, ,,		Hole & Party, Carrington Claim, Bowling Alley Point, near Nundle.
	55H	,, ,,		A. C. Thompson's Claim, Hanging Rock, near Nundle.
	56H	,, ,,		
			oz. dwt. gr.	
	74H	1 pc. gold in calcite.	1 4 12	Black Snake Reef, near Nundle, Peel River Gold Field.
	75H	1 ,, ,,	0 3 4	Marquis of Lorne Reef, Bowling Alley Point, Peel River.
	76H	1 ,, gold	1 2 14	W. Smith's Claim, Shelton Gully, Bowling Alley Point, Peel River.
	77H	1 ,, ,,	0 13 12	W. Thompson's Claim, Shelton Gully, Bowling Alley Point, Peel River.
	78H	1 ,, ,,	1 1 13	Brown & Co.'s Claim, Shelton Gully, Bowling Alley Point, Peel River.
	79H	1 ,, ,,	0 14 0	Marr & Co's. Claim, Shelton Gully, Bowling Alley Point, Peel River.
	80H	2 ,, ,,	0 7 5	Rawcroft & Co.'s Claim, Shelton Gully, Bowling Alley Point, Peel River.
	81H	1 ,, ,,	0 13 0	G. King & Co.'s Claim, Price's Gully, Bowling Alley Point, Peel River.
	82H	1 ,, ,,	0 3 11	G. King & Co.'s Claim, Price's Gully, Bowling Alley Point, Peel River.
	83H	4 ,, ,,	0 11 20	,, ,, ,,
	84H	1 ,, ,,	0 8 22	Westerway, Isaacsohn & Co., Lady Carrington Claim, Bowling Alley Point, Peel River.
	85H	4 ,, ,,	0 7 18	,, ,, ,,
	86H	5 ,, ,,	0 5 19	,, ,, ,,
	87H	1 ,, ,,	0 12 18	Rockham & Co.'s Claim, Spring Gully, near Nundle.
	88H	1 ,, ,,	0 16 11	Clayton and Irish's Claim, Hanging Rock.
	89H	1 ,, gold in qtz.	0 8 5	Mason, Bowling Alley Point.
	90H	1 ,, ,,	0 5 8	J. Henderson, Manning R., Clarence River.
	91H	4 ,, gold	0 8 22	Simchock & Co.'s Claim, Maddyn's Gully, Bowling Alley Point.
	92H	4 ,, ,,	0 10 23	,, ,, ,,
	93H	12 ,, ,,	0 7 23	Various parts, Bowling Alley Point.
	94H	12 ,, ,,	0 7 1	,, ,, ,,

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.—Reef and Alluvial Gold.

Isaacsohn, Martin, Nundle.—Reef and Alluvial Gold Specimens—*continued.*

No.	Exhibitors' List No.	Name.	oz.	dwt.	gr.	Locality.
	95H	12 pc. gold	0	7	8	Various parts, Bowling Alley Point.
	96H	12 „ „	0	7	0	„ „ „
	97H	9 „ „	0	11	3	Oakenville Creek, near Nundle.
	98H	1 „ gold in qtz.	0	1	9	Oldenhoff, New Holland, German New Guinea.
	99H	3 „ „	0	5	22	Gazley & Co., Madwig's Ridge, near Nundle.
	100H	2 „ „	0	16	2	G. Lawrence & Co., „ „
	101H	1 „ „	0	15	0	C. Schroder & Co., „ „
	102H	1 „ gold in calcite	0	12	5	Paxton, Hill End.
	103H	1 „ gold in qtz.	1	4	17	P. Robertson & Coy., Black-snake Creek Reef, near Nundle.
	104H	1 „ „	2	6	7	Bariken Hill, Bowling Alley Point.
	105H	1 „ „	8	2	7	W. Rowes, Hanging Rock.
	106H	1 pct. gold in state	2	13	7	Rockham & Co., Gap Claim, near Nundle.
	107–9H	3 wire gold in quartz.	.....			Thompson and Isaachsohn's Claim, near Hanging Rock, near Nundle.
	110H	3 wire gold in quartz.	1	10	9	„ „ „
	111–114H	4 pcs. gold in quartz.	.....			„ „ „
	115H	1 pc. gold in qtz.	1	19	10	„ „ „
	116H	1 „ „	23	16	8	„ „ „
	117H	1 „ „	0	15	22	„ „ „
	118H	1 „ „	3	15	0	„ „ „
	119H	2 „ „	5	8	23	„ „ „
	120–129H	10 pcs. „	.....			„ „ „
	130H	1 pc. „	.....			Eleanora Mine, Hillgrove, New England.
	131H	5 „ „	0	9	12	Thompson and Isaacsohn's Claim, near Hanging Rock.
	132H	1 „ „	.....			„ „ „
	58H	„ „	0	16	6	John Leonard's Claim, Spring Gully, near Nundle.
	59H	„ „	0	8	4	John Rackman's Claim, The Vixen, near Nundle.
	60H	„ „	0	10	0	
	61H	„ „	0	6	18	
	62H	„ „	0	2	17	
	63H	„ „	0	7	8	Woolomin.
	67H	„ „	1	2	18	Smith & Party's Sluicing Claim, Folly Creek, near Hanging Rock, near Nundle.
	68H	„ „	0	9	10	King & Party, Price's Gully, Bowling Alley Point, near Nundle.
	69H	„ „	0	18	6	
	70H	„ „	0	19	0	Westerway & Heffernan, Aunty's Gully, Bowling Alley Point, near Nundle.
	71H	„ „				
	72H	„ „	0	16	12	Ah Chong & Co.'s Claim, Okenvale Creek, near Nundle.
	73H	„ „	.....			Isaacsohn & Co.'s Claim, Mount Ephraim, near Nundle.
	5H	Alluvial gold...	0	4	12	Chinaman's Claim, German Flat, Bowling Alley Point, Peel River.
	6H	„ „	0	4	22	Webster's & Corbett's Claim, Bowling Alley Point, Peel River.
	7H	„ „	0	4	16	Ah For's Claim, Corbett's Claim, Bowling Alley Point, Peel River.
	8H	„ „	0	4	12	J. Hickling's Claim, Price's Nob, Bowling Alley Point, Peel River.

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.—Reef and Alluvial Gold.

Isaacsohn, Martin, Nundle.—Reef and Alluvial Gold Specimens—*continued.*

No.	Exhibitors' List No.	Name.	oz.	dwt.	gr.	Locality.
	9H	Alluvial gold...	0	4	1	Corbett Bros. Claim, Priee's Gully, Bowling Alley Creek, Peel River.
	10H	,, ,,	0	4	0	Stephens & Co.'s Claim, Priees Gully, Bowling Alley Point, Peel River.
	11H	,, ,,	0	4	4	Cordwell's Claim, Blackfellow's Gully, Bowling Alley Point, Peel River.
	12H	,, ,,	0	5	0	Howarth & Sipple's Claim, Mount Ephraim, near Nundle.
	13H	,, ,,	0	5	0	Mt. Pheasant Cement G.M. Co., near Nundle, near Nundle.
	14H	,, ,,	0	4	17	Lyon's Claim, Swamp Creek, near Nundle, Peel River.
	15H	,, ,,	0	3	9	Ah Hoy's Claim, Kelly's Point, near Nundle, Peel River.
	16H	,, ,,	0	4	13	Ah Kin's Claim, Kelly's Point, near Nundle, Peel River.
	17H	,, ,,	0	2	19	Ah Chong & Party's Claim, Davis Flat, near Nundle, Peel River.
	18H	,, ,,	0	4	12	Walker & Robson's Claim, Camp Claim, near Nundle, Peel River.
	19H	,, ,,	0	4	20	Powell & Co.'s Claim, Butcher's Gully, near Nundle.
	20H	,, ,,	0	3	2	Stanton & Powell's Claim, Butcher's Gully, near Nundle, Peel River.
	21H	,, ,,	0	5	6	Ah Toy's Claim, Happy Valley, near Nundle.
	22H	,, ,,	0	4	17	Harry Clark's Claim, Happy Valley, near Nundle.
	23H	,, ,,	0	5	0	Lord & Co.'s Claim, Oakenville Creek, near Nundle.
	24H	,, ,,	0	3	0	Radley & Westerway's Claim, Oakenville Creek, near Nundle.
	25H	,, ,,	0	4	13	Ah Chong & Party's Claim, Oakenville Creek, near Nundle.
	26H	,, ,,	0	4	0	S. Walker & Co.'s Claim, Oakenville Creek, near Nundle.
	27H	,, ,,	0	5	0	Ah Foo's Claim, Oakenville Creek, near Nundle.
	28H	,, ,,	0	5	0	T. Schofield's Claim, Oakenville Creek, near Nundle.
	29H	Gold in quartz	0	10	0	Clark & Carious' Claim, Black Snake Reef, near Nundle.
	30H	,, ,,	0	3	10	A. N. W. Thompson's Claim, Swamp Creek, near Nundle.
	31H	,, ,,	.....			Captain's Reef, Peel River.
	32H	,, ,,	.....			S. Walker's Claim, Spring Gully, near Nundle.
	33H	,, ,,	.....			
	34H	,, ,,	.....			Silverton, Barrier Range.
	35H	,, ,,	.....			
	93	,, ,,	.....			Glen Morrison, near Walcha, New England.
	95	,, ,,	.....			Solferino, Clarence River District.
	115	,, ,,	.....			
	96	,, ,,	.....			Gulgong, Mudgee District.
	97 to 99	,, ,,	.....			Little Bendigo Reef, Bingera.
	105	,, ,,	.....			Swamp Oak, Denison Diggings.
	53H	,, ,,	.....			Adeline Gold-mining Co., Fairfield, Drake.
	54H	,, ,,	.....			

Isaacsohn, Martin, Nundle.—Gold Specimens, Silver Ores, &c.—*continued.*

No.	Exhibitors' List No.	Name.		Locality.
			oz. dwt. gr.	
	57II	Gold in quartz	.....	Young Garryowen Claim, Wood's Reef, Ironbarks, Barraba.
	47II	,, ,,	.....	Jim Crow Mountains, Victoria.
	48II	,, ,,	.....	Mount Morgan, Queensland.
	49II	,, ,,	.....	
	64II	,, ,,	0 2 12	Jasup's Gully, Palmer River, Queensland.
	65II	,, ,,	.....	,, ,, ,, ,,
	66II	,, ,,	0 8 18	,, ,, ,, ,,
	51II	,, ,,	.....	Bright Smile Claim, New Zealand.
	467II	Auriferous Antimony Ore.		Eleanora Mine, Hillgrove, New England.
	469II	Auriferous Cement.		Bowling Alley Point, Nundle.
	477II	Auriferous Pyrites.		Thompson, Isaacsohn, & Co., Hanging Rock, Nundle.
	478II	Auriferous Conglomerate.		Foley's Folly, Hanging Rock, Nundle.
	479II	Auriferous Conglomerate.		,, ,,

979. Silver Ores.

48	Silver Ore...	Silverton, Barrier Range.
51 to 54	,, ,,	
58	,, ,,	
167	,, ,,	
169	,, ,,	
170	,, ,,	
182	,, ,,	
183	,, ,,	
113 to 117	,, ,,	
129	,, ,,	
160	,, ,,	Moruya, Southern District.
161 to 164	.....	Hulfe Guttes Mine, near Murrurundi.
421II	Kaolin, with Native Silver	Central Broken Hill Silver Mine, Barrier Range.
422II		
423II	Kaolin, with Chloride of Silver.	
424II	Silver Ore, with Native Silver	
425II	Silver Ore, with Iodide of Silver.	
426II	Silver Ore, with Chloride and Iodide.	
428II	Silver Ore, with Native Silver.	
429II	Silver Ore, with Chloro-iodide of Silver.	
430II	Silver Ore (manganic).	

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 299 and 291: Collections of Minerals, Ores, &c.—Silver and Tin Ores.

Isaacsohn, Martin, Nundle.—Silver Ores, &c.—*continued.*

No.	Exhibitors' List No.	Name.	Locality.
	431H	Silver Ore, with Iodide.	Central Broken Hill Silver Mine, Barrier Range.
	422H	,, ,,	
	433H	,, ,,	
	434H	Silver Ore (carbonate ore).	
	435H	,, ,,	
	436H	Silver Ore (anglesite).	
	437H	Silver Ore (massive lead carbonates).	
	440H	Silver Ore, with Chloride.	
	444H	Silver Ore, with Iodide.	
	446H	Silver Ore (copper and native silver).	
	427H	Silver Ore (canary ore).	Day Dream Mine, Barrier Range.
	439H	.....	
	442H	.....	
	441H	Silver Ore, with Chloride.	Jupiter Mine, Appollyon Valley, Barrier Range.
	445H	Silver Ore.....	Umberumberka Mine, Barrier Range.
	459H	Silver Ore (silicate of zinc).	Block 14 Mine, Barrier Range.
	461H	Silver Ore (chloride in manganese oxide).	Broken Hill, Barrier Range.
	462H	Silver Ore (kaolin ore).	
	463H	Silver Ore (lead carbonate).	
	464H	Silver Ore (chloride in manganese oxide).	
	465H	Silver Ore (chlorobromide).	
	457H	Matte—Copper, 50 per cent.; silver, 250oz. per ton.	Central Broken Hill, Barrier Range.
	458H	Slag	
	443H	Lead Ore	Ediacare Mine, South Australia, Barrier Range.

980. Tin Ores.

	1 to 7	Stream Tin Ore	Vegetable Creek, New England.
	416	,, ,,	
	17	,, ,,	New England.
	22	,, ,,	
	24	,, ,,	
	26	,, ,,	

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.—Copper.

Isaacaohn, Martin, Nundle.—Tin Ores, &c.—*continued.*

No.	Exhibitors' List No.	Name.	Locality.
	9	Stream Tin Ore	Cope's Creek, New England.
	11	,, ,,	
	12	,, ,,	
	13	,, ,,	
	14	.....	Giant's Den, near Bendemeer, New England.
	16	.....	Near Glen Innes, New England.
	18	Stream Tin Wash	New England.
	21	,, ...	
	25	,, ...	
	27	,, ...	
	28	,, ...	
	8	Lode Tin Ore...	Cope's Creek, New England
	10	,, ...	
	29	,, ...	
	154	,, ...	
	155	,, ...	
	352	,, ...	
	356	,, ...	
	19	,, ..	New England.
	23	,, ...	,,
	368	,, ...	Giant's Den, near Bendemeer, New England.
	380	,, ...	Tingha, New England.
	417	,, ...	Mole Tableland, New England.

981. Copper Ores.

	165	Copper Ore ...	Dungowan Creek, near Tamworth.
	166	,, ...	,, ,, ,,
	318	,, ...	,, ,, ,,
	335	,, ...	,, ,, ,,
	50	,, ...	Wallabadah.
	52	,, ...	New South Wales.
	56	,, ...	
	55	,, ...	Cow Flat, Bathurst District.
	57	,, ...	,, ,, ,,
	62	,, ...	Nundle, Peel River.
	150	,, ...	
	151	,, ...	
	315	,, ...	Mount Perry, Queensland.
	398 to 401	,, ...	
	395	,, ...	Burra Burra, South Australia.
	402	,, ...	
	140	,, ...	Severn River, New South Wales.
	446H	Copper Ore (argentiferous)	Central Broken Hill Silver Mine, Barrier Range.
	447H	,, ,,	
	449H	Copper Ore (azurite, argentiferous)	Central Broken Hill Silver Mine, Barrier Range.
	450H	,, ,,	
	451H	Copper Ore ...	
	452H	.....	
	453H	Native Copper..	
	454H	,,	
	455H	,,	
	456H	,,	
	460H	Copper Ore (peacock).	Broken Hill, Barrier Range.

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.—Antimony and Iron Ores.

Isaacsohn, Martin, Nundle.—Antimony Ores, &c.—*continued.*

No.	Exhibitors' List No.	Name.	Locality.
982. Antimony Ores.			
	116 to 120	Antimony Ore	Nundle, Peel River.
	404	,, ...	Victoria.
	405	,, ...	
983. Iron Ores.			
	77	Iron Ore ...	Bowling Alley Point, Nundle.
	80	,, ...	
	85	,, ...	
	74	,, ...	
	226	,, ...	
	472H	Magnetic iron	Hanging Rock, Nundle.
	473H	,, ...	,, ,,
	63 to 74	Pyrites ...	Bowling Alley Point, Nundle, Peel River.
	83	,, ...	,, ,, ,, ,, ,,
	84	,, ...	
	87	,, ...	
	99	,, ...	
	71	,, ...	Foley's Folly, near Hanging Rock, Nundle.
	81	,, ...	
	82	,, ...	
	98	,, ...	
	383	,, ...	Brunker's Hill, near Nundle.
	384	,, ...	
	101 to 109	Mispiekel ...	Bowling Alley Point, Peel River.
	93	,, ...	Nundle, Peel River.
	355	Chromite ...	Bowling Alley Point, Nundle, Peel River.
	122	,, ...	New Caledonia.
	392 to 394	Nickel Ore ...	
	49	Ilmenite ...	New South Wales.
984. Gem Stones, &c.			
	43	Gem stones ...	Cope's Creek, New England.
	184		Nundle, Peel River.
	35	Topazes	Cope's Creek, New England.
	37	,, ...	,, ,,
	42	Beryls.....	,, ,,
	33	Spinels	Inverell ,,
	186	,, ...	Cope's Creek ,,
	187	,, ...	,, ,,
	316	,, ...	,, ,,
	317	,, ...	,, ,,
	369	Rubies	Puddledock ,,
	185	Zircons	Nundle, Peel River.
	370	Sapphires	Puddledock.
	91	Opal	Hanging Rock, Nundle.
	140	,, ...	,, ,,
	141		
	142		
	319	,, ...	,, ,,
	60	,, ...	,, ,,
	403	,, ...	,, ,,
	39	Cairngorm.....	Cope's Creek, New Englaud.
	41	,, ...	,, ,,
	189	,, ...	,, ,,

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.—Miscellaneous.

Iaaacsohn, Martin, Nundle.—Gem Stones, &c.—*continued.*

No.	Exhibitors' List No.	Name.	Locality.
	357 to 359	Cairngorm.....	Cope's Creek, New England.
	38	Rock crystal...	,, ,,
	40	Quartz crystal.	New England.
	235 to 242	,, ...	Opossum Reef, Bowling Alley Point, Peel River.
	247	,, ...	,, ,, ,,
	269	,, ...	,, ,, ,,
	304	,, ...	,, ,, ,,
	324 to 332	,, ...	,, ,, ,,
	243 to 246	,, ...	Foley's Reef ,, ,,
	248 to 250	,, ...	,, ,, ,,
	252 to 263	,, ...	,, ,, ,,
	266 to 268	,, ...	,, ,, ,,
	270 to 302	,, ...	,, ,, ,,
	251	,, ...	Marquis of Lorne Reef, near Nundle.
	303	,, ...	Dangar's Gully, Bowling Alley Point, Peel River.
	31	Agates	Cope's Creek, New England.
	94	,, ...	New South Wales.
	126 to 128	,, ...	Hanging Rock, Nundle, Peel River. Foley's Folly, Bowling Alley Point.
	159	,, ...	Nundle, Peel River.
	138	Jasper	Dangar's Gully, Nundle.
	95	,, ...	,, ,,
	139	,, ...	Foley's Folly ,,
	36	Rose quartz ...	New South Wales.

985. Miscellaneous Specimens.

30	Marble	Newmingah Flat, near Tamworth.
223	,, ...	Nundle, Peel River.
314	,, ...	Cook's Flat.
132 to 135	Calcite	New South Wales.
156	,, ...	,,
203 to 205	,, ...	Blairmore Mine, Bowling Alley Point, Peel River.
377	,, ...	Bowling Alley Point, Peel River.
378	,, ...	Hanging Rock.
192	Magnesite.	Nundle, Peel River.
227 387 388	Stalactites...	Isis River.
157 158	Felspar	Moree Creek, near Tamworth.
193	,, ...	Liverpool Plains.
144 to 146 320	Serpentine...	Bowling Alley Point, Peel River.
321	,, ...	Nundle, Peel River.
351	,, ...	Dangar's Gully, near Nundle, Peel River.
360 361	Asbestos ..... ,, ...	Barnard River.
92	Hornblende ...	Giant's Den, near Bendemeer.
152 334	,, ...	Nundle, Peel River.
121	Dolomite	Bowling Alley Point, Peel River.
123	Granite	
143	Slate	Nundle Creek, near Nundle.
175 176 198 199	Porphyry (?)	Nundle, Peel River.

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.—Fossils.

Isaacschon, Martin, Nundle.—Miscellaneous Specimens, &c.—*continued.*

No.	Exhibitors' List No.	Name.	Locality.
	196, 197	Shale	Nundle, Peel River.
	173, 174, 224	Sedimentary deposit	,, ,,
	308	Cement	,, ,,
	177	Ironstone	,, ,,
	44, 45	Quartz, with pyrites.	Foley's Reef, Bowling Alley Point, Peel River.
	46	Bismuth ore (?)	
	61	Quartz	
	75, 76	Carbonate of iron (?)	Bowling Alley Point, Peel River.
	78	Iron & manganese oxide	Giants' Den, Bendemeer.
	79	Silieate of iron	Nundle, Peel River.
	86	Basalt with mispickel.	Bowling Alley Point, Peel River.
	112	Hornblende & mispickel.	Nundle, Peel River.
	153	Copper & iron pyrites.	Severn River.
	188	Magnetic pyrites	Nundle, Peel River.
	206 to 209	Waterworn pebbles.	Swamp Creek, Nundle, Peel River.
	228	Honeycomb quartz.	Nundle, Peel River.
	229	Hollow rock crystal	,, ,,
	466H	Mica	Barrier Range.
	468	Tourmaline, in quartz.	New England.
	474H	Silica and Calc spar.	Dangar's Gully, near Nundle.
	475H	Silica and Dolomite.	,, ,,
	476H	Talc	,, ,,
	230	,, ...	Mount Pleasant, near Nundle.
	231	,, ...	Bowling Alley Point, Peel River.
	389 to 391	Kauri gum ...	New Zealand.
	396	Cuprite	Cornwall, England.
	397	Ore	1,100 feet level, England.
	408	Axinite (?) ...	Bowling Alley Point, Peel River.
	411	Port Darwin...	Iron oxide.

986. Fossils.

	171, 172, 362 to 367, 374, 412 to 415	Tertiary leaves.	Mount Pleasant, Nundle, Peel River.
	225	Fossils	Marine.
	470H, 471H	Fossil leaves (Tertiary).	Mount Sheba, Nundle.

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291 : Collections of Minerals, Ores, &c.—Gold.

987. LIVERSIDGE, Archibald, M.A., F.R.S., Professor of Chemistry, University of Sydney.

Crystallised and other Gold Specimens.

		Weight. grms.
1	Model of specimen of crystallised gold (now in the Edinburgh Museum, see pamphlet)	.....
2	Crystallised gold, Gulgoug, N.S.W., four specimens	5·82
3	,, ,, one ,,	14·44
4	,, ,, ,, ,,	6·92
5	,, in octahedra, &c., Louisa Creek, Orange, N.S.W., three specimens	1·665
6	Crystallised gold, Louisa Creek, Orange, N.S.W., two specimens	·429
7	,, in octahedra, three specimens	·37
8	,, Lion Reef, Grafton, N.S.W., one specimen	9·277
9	,, ,, ,, four specimens	5·097
10	,, Mudgee, N.S.W., one specimen	5·94
11	Lace gold, N.S.W., three specimens	2·37
12	,, ,,	3·099
13	Gold, crystallised, N.S.W., one specimen	·685
14	,, from calcite, Gympie, Queensland, two specimens	1·424
15	,, ,, to compare with the above, Gympie, Q.	3·290
16	,, ,, ,, ,,	1·502
17	,, ,, Gympie, Queensland, large specimen	2·194
18	Gold nuggets (four), Armidale, N.S.W.	7·43
19	Gold nugget (one), Long Gully, New England, N.S.W.	2·23
20	Gold nuggets (three small), Bingera, N.S.W.	3·343
21	,, (two), N.S.W.	·942
22	Alluvial gold, Mittagong, N.S.W.	·05
23	,, (coarse grains), Bora Creek, Bingera, N.S.W.	.....
24	,, (fine grains), Doctor's Creek, ,,	.....
25	,, (fine), found with diamonds, N.S.W.	.....
26	,, Mount Ephraim, Nundle, N.S.W.	.....
27	,, Palmer River, Queensland, to compare with N.S.W.	.....
28	Gold in octahedra, Bendigo, Victoria	.....
29	Gold, Fairfield, N.S.W.	.....
30	Gold set free by dissolving away the quartz with hydrofluoric acid	·802
31	,, ,, ,, ,,	10·795
32	,, with native copper, Mount Pleasant, Nundle, N.S.W.	11·335
33	Platinum and gold, near Condobolin, N.S.W.	13·971
34	Spurious gold, to compare with genuine alluvial gold, Ballarat, Victoria	12·144
35	,, mixed with some real gold, Ballarat, Victoria	24·917
36	Two nuggets "Great nugget vein," Louisa Creek, N.S.W.	5·129
37	Alluvial gold in cement, Tambaroora, New South Wales	3·627
38	Gold in ferruginous cement	19·799
39	,, in quartz (3 specimens), from the original "find" in Louisa Creek, Turon, N.S.W. Obtained on the spot by J. Alger, Esq., 1854	180·1
40	,, in cavities, with chlorite in quartz, Grenfell, N.S.W.	94
41	,, ,, in quartz, with iron oxide, Grenfell, N.S.W.	151·7
42	,, in cavity, imperfectly crystallised, probably set free from $Fe\ S_2$, Turon, N.S.W.	108·1
43	,, in cavities in quartz, Grenfell, N.S.W.	60·5
44	,, crystallised, with iron oxide, in cavities in vein quartz, Grenfell, N.S.W.	121·4
45	,, in vein quartz (3 specimens), opened up by heating and quenching in cold water, Grenfell, N.S.W.	63·6
46	Gold crystallised, in cavities in quartz, Grenfell, N.S.W.	92·8
47	,, crystalline lining cavity in vein quartz, associated with chlorite, Grenfell, N.S.W.	83·8
48	,, in cavities in vein quartz, set free from pyrites, Grenfell, N.S.W.	250·4
49	,, ,, in quartz with iron oxide, evidently set free from decomposed pyrites, Grenfell, N.S.W.	54·5
50	Gold imperfectly crystallised in cavities of vein quartz, weathered, Grenfell, N.S.W.	120·4

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.—Moss Gold, Silver and Copper.

		Weight.
51	Gold in cavities in vein quartz, with iron oxide, set free from pyrites, Grenfell, N.S.W.	grms. 77
52	,, in cavities in vein quartz, set free from pyrites, Grenfell, N.S.W.	371
53	,, ,, quartz, probably formed by the removal of pyrites	91
54	,, crystalline, in cavities in quartz, set free from pyrites, Grenfell	134·5
55	,, in quartz, with iron oxide, Grenfell	38·2
56	,, in vein quartz, stained with iron, Grenfell	34·2
57	,, in gossan or cavernous quartz, containing iron oxide, evidently from decomposition of pyrites	157·7
58	,, somewhat crystalline, in quartz, associated with brown oxide of iron, Grenfell, N.S.W	102·7
59	,, in crystallised white vein quartz, slightly weathered, Grenfell, N.S.W.	416·3
60	,, in scattered grains in vein quartz, Grenfell, N.S.W.	381·4
61	,, crystallised in vein quartz, Grenfell, N.S.W.	64·2
62	,, with chlorite in vein quartz, Grenfell, N.S.W.	312·2
63	,, ,, white ,, ,,	44·1
64	,, greenish, on pseudomorphous quartz, Grenfell, N.S.W.	138·8
65	,, in rotten quartz, Grenfell, N.S.W.	29·4
66	,, in quartz, Mount Ephraim, Nundle, N.S.W.	31
67	,, ,, Braidwood, N.S.W.	245
68	,, Straus Gold-mining Co., Fairfield, N.S.W.	520·2
69	,, in quartz, Mount Pleasant, Nundle, N.S.W.	2·45
70	,, ,, Prince Alfred Reef, Denison Diggings	4·35
71	,, ,, Swamp Oak Creek, Denison Diggings	3·25
72	,, in (Jasper) vein quartz, bounded by white quartz, Grenfell, N.S.W.	86·1
73	,, in calcite vein, Barraba, N.S.W.	129·36
74	,, auriferous arsenical pyrites and antimony in calcite, New Reform Mine, Lucknow, N.S.W.	186
75	,, auriferous arsenical pyrites and antimony in calcite, New Reform Mine, Lucknow, N.S.W.	248
76	,, on pyrites, Ironclad Reef, Cargo, N.S.W.	69
77	,, in calcite (2 specimens), Gympie, Queensland	12·2
78	,, powder-like form on pyrites, N.S.W.	40·5
79	,, (thin) on iron oxide and quartz ,,	15·960
80	,, in mispickel, Big Oakey Gold Mine, Sofala, near Bathurst, N.S.W.	770·9
81	,, on nodule of metallic arsenic, Lunatic, N.S.W.	40·69
82	,, in serpentine, with mispickel, New Reform Gold-mining Co., Lucknow, N.S.W.	12·685
83	,, in dolomite, with marmolite, Gundagai, N.S.W.	5¾ oz.
		grms.
84	Osmo-iridium, found with alluvial gold	48·36
85	Gold in pyrites, Mount Morgan, Queensland	100·1
86	,, ore in gossan, ,, ,,	474·1
87	,, ,, ,, ,, 1,000 oz. per ton	154
88	,, ,, ,, ,,	64·5
89	Stalactite, silicious hæmatite, Mount Morgan, Queensland	92·7
90	,, ,, ,, ,,	48·7

988. Moss Gold, Moss Silver, and Moss Copper Specimens.

1 Moss gold from mispickel, Lucknow, NS.W.
2 ,, ,, ,, ,,
3 ,, amalgam.
4 ,, ,,
5 Matted gold, really branching, Hungary, to compare with moss gold.
6 Native moss gold on mispickel, Lucknow, N.S.W.
7 Moss silver from silver sulphide.
8 ,, ,,
9 ,, ,,
10 ,, ,, on micro slide.
11 Moss copper to compare with other moss metals.
12 ,,

989. Cut Specimens of Gems and Precious Stones from New South Wales.

1. Green sapphire or Oriental emerald, cut specimen from Bingera, N.S.W.; weight, ·967 gramme; specific gravity, 4·00; dimensions, ·397 × ·391 × ·233 in. In ring mount.
2. Sapphire, royal blue, cut specimen; Bingera, N.S.W.; weight, ·648 gramme; specific gravity, 3·94; dimensions, ·391 × ·293 × ·177 in.
3. Sapphire, royal blue, cut specimen; Bingera, N.S.W.; weight, ·139; specific gravity, 4·11; dimensions, ·240 × ·194 × ·096 in. In ring mount.
4. Topaz, colourless; Inverell, N.S.W.; weight, 11·601 gramme; specific gravity, 3·56; dimensions, 1·303 × ·800 × ·650 in. Mounted as a pendant.
5. Topaz, colourless; Inverell, N.S.W.; weight, 1·521 gramme; specific gravity, 3·56; dimensions, ·471 × ·468 × ·300 in. In ring mount.
6. Opal, small; N.S.W.; weight, ·114 gramme; specific gravity, 2·01; dimensions, ·288 × ·214 × ·115 in. In ring mount.
7. Opal, flawed; N.S.W.; weight, ·361 gramme; specific gravity, 2·07; dimensions, ·362 × ·298 × ·212 in. In ring mount.
8. Zircon; Mudgee, N.S.W.; weight, ·402 gramme; specific gravity, 4·69; dimensions, ·284 × ·292 × ·155 in. In ring mount.
9. Imperfect star sapphire; N.S.W.
10. Three specimens adamantine spar, or brown corundum, cut and polished *en cabochon*; Mudgee, N.S.W.
11. Two sapphires, N.S.W., *en cabochon*.

Diamonds, uncut.

		Weight.
12.	Diamond, tetrahedron, Lachlan River	·115 grms.
13.	Nine small diamonds; Bingera, N.S.W.	·335 ,,
14.	Diamond, dark, in octahedron; Bingera, N.S.W.	·290 ,,
15.	Black diamond; Mudgee, N.S.W.	·735 ,,

16. Diamond; Bengonaway Diamond Co., near Inverell, N.S.W.
17. Opals (two small specimens).

990. Specimens from the Bingera Diamond Deposits, New England District, New South Wales.

1. Older conglomerate, Bingera, N.S.W. (2 specimens).
2. ,, ,,
3. New conglomerate ,,

			Weight.
4.	,,	,,	1 lb. 5¼ oz.
5.	,,	,,	1 ,, 5 ,,
6.	,,	,,	1 ,, 2 ,,

7. Green jasper ,,
8. Dendritic markings on rock ,,
9. Greenish jasper pebble ,,
10. Greenish jasper ,,
11. Decomposed diorite (?) nodule, scaling off in concentric coats, Bingera, N.S.W.
12. Red jasper, Bingera, N.S.W.
13. Black jasper ,,
14. Brown-red jasper ,,
15. Jasper, with white quartz veins, Bingera, N.S.W.
16. Banded quartz ,,
17. Hardened shale ,,
18. Diallage rock ,,
19. Calcite ,,
20. Impure magnesite accompanying limonite nodules ,,
21. Impure magnesite ,,
22. Magnesite ,,
23. ,, ,,
24. ,, ,,
25. ,, ,,

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.—Gems and Precious Stones.

26.	Sandstone pebble,	Bingera, N.S.W.	
27.	Fossil wood	,,	
28.	,,	,,	
29.	Sandstone pebble	,,	
30.	Hæmatite	,,	
31.	,,	,,	
32.	Serpentine,	,,	Weight.
33.	Wash-dirt, diamond drift,	,,	1 lb. $5\frac{1}{2}$ oz.
34.	,, ,,	,,	1 ,, $6\frac{1}{4}$,,
35.	,, ,,	,,	1 ,, 8 ,,
36.	Limonite concretions,	,,	1 ,, $0\frac{1}{2}$,,
37.	Pebbles,	,,	$5\frac{1}{4}$,,
38.	,,	,,	$5\frac{3}{4}$,,
39.	Quartz pebbles,	,,	$1\frac{3}{4}$,,
40.	Pebbles,	,,	$9\frac{3}{4}$,,
41.	,, tourmaline, zircon, topaz, pleonaste,	,,	$11\frac{3}{4}$,,
42.	,, principally quartz,	,,	$5\frac{3}{4}$,,
43.	,,	,,	8 ,,
44.	Gem sand,	,,	$13\frac{1}{2}$,,
45.	,,	,,	$8\frac{1}{2}$,,
46.	,,	,,	$10\frac{1}{4}$,,
47.	,,	,,	$9\frac{1}{4}$,,
48.	,,	,,	1 lb. 9 ,,
49.	,,	,,	$7\frac{3}{4}$,,
50.	,,	,,	$1\frac{3}{4}$,,
51.	,,	,,	$6\frac{3}{4}$,,
52.	,,	,,	1 lb. $2\frac{1}{2}$,,
53.	Rolled tourmaline,	,,	$2\frac{3}{4}$ oz.
54.	Quartz, &c.,	,,	$2\frac{1}{4}$,,
55.	Pleonaste, &c.,	,,	$\frac{3}{4}$,,
56.	Magnetite,	,,	21 grms.
57.	Garnet,	,,	11 ,,
58.	Fine zircon sand,	,,	$9\frac{1}{2}$ oz.
59.	Small jasper pebbles, called "Morlops" by the miners,	,,	21·7 grms.
60.	Crystallised spinel (3 specimens)	,,	0·269 ,,
61.	Gem sand,	,,	7·3 ,,
62.	Sapphires,	,,	17 ,,
63.	,,	,,	14·7 ,,
64.	Titaniferous iron,	,,	·998 ,,

991. From Bengonaway Diamond Mines, near Inverell.

65.	Conglomerate, Koh-i-noor Diamond Mines, Inverell, N.S.W.		
66.	Feldspar pebble, ,, ,,	,,	
67.	Diamond deposit, ,, ,,	,,	
68.	Conglomerate, Bengonaway Diamond Mines,	,,	Weight.
69.	Pebbles, &c., ,, ,,	,,	$12\frac{1}{4}$ oz.
70.	,, mainly white quartz, Bengonaway Diamond Mines, N.S.W.		11 ,,

992. Specimens from Du Toit's Pan Diamond Deposits, Cape Diggings South Africa, to compare with those found in N.S.W.

		Weight.
71.	Diamond matrix (volcanic ash)	$5\frac{1}{2}$ oz.
72.	Pyrites and carbon	$6\frac{1}{2}$,,
73.	Decomposed rock	15·26 grms.
74.	Green bronzite from the dry diggings	47·8 ,,
75.	,, ,, ,,	5·5 ,,

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.—Gems and Precious Stones.

		Weight.
76.	Calcite, &c.	10·61 grms.
77.	Iron pyrites, marcasite and cubical pyrites	44·1 „
78.	"Carbon"	12 73 „
79.	Enstatite "pebbles"	6·62 „
80.	Garnets	5·81 „
81.	Agates (10 specimens)	3½ „

993. Gems and associated Minerals from the Wingecarribee River, Berrima, New South Wales.

		Weight.
82.	Quartz, jasper, and other pebbles.	
83.	Conglomerate.	
84.	„ calcined	8¾ oz.
85.	Pebbles	2¼ „
86.	Quartz, jasper, chalcedony, and agate pebbles	5 „
87.	„ pebbles, agate, chalcedony, and carnelian	3¾ „
88.	Brown jasper, from gem sand	18·7 grms.
89.	Pebbles „ „	32·5 „
90.	Small gems obtained from the burnt and crushed conglomerate	10 8 „
91.	Gem sand from burnt and crushed conglomerate	20·2 „
92.	Gem sand (mixed)	14·7 „
93.	„ (coarse)	103·2 „
94.	„	54·4 „
95.	„	7½ oz.
96.	Titaniferous iron, pleonaste, &c., from gem sand	4 „
97.	„ „ from gem sand	98·3 grms.
98.	Pleonaste, „ „	91 „
99.	Zircons	67·2 „
100.	„	180·3 „
101.	„	83·3 „
102.	„	6½ oz.
103.	„	43·2 grms.
104.	„	21·8 „
105.	Green sapphire, &c.	38 „
106.	Brown „	133 „
107.	Two green sapphires	1·76 „

994. Gems and associated Minerals from Uralla, New England District, N.S.W.

		Weight.
108.	Titaniferous iron, Uralla, N.S.W.	2½ oz.
109.	Limonite and zircons, „	9 „
110.	Gem sand, „	14¼ „
111.	„ „	61·8 grms.
112.	„ „	34·9 „
113.	„ „	3¼ oz.
114.	Zircon sand, „	1lb. 2 „
115.	Gem sand, „	1 „ 1 „
116.	Tourmaline, „	2 „ ½ „
117.	„ „	2½ „
118.	„ „	6·7 grms.
119.	„ (part of a large crystal), Broken Hill, N.S.W.	122 „
120.	Schorl in granite, Albury, N.S.W.	203·5 „
121.	Pleonaste, N.S.W.	26 „
122.	Zircons, „	10 oz.
123.	„ Rocky River, „	4 „
124.	„ „	19·2 grms.
125.	„ „	4½ oz.
126.	Quartz pebbles, chalcedony, and topaz, N.S.W.	34·15 grms.
127.	Titaniferous iron, N.S.W.	3 oz.

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291 : Collections of Minerals, Ores, &c.—Gems and Precious Stones.

		Weight.
128.	Pleonaste, N.S.W.	16·67 grms.
129.	Zircons, ,,	11·55 ,,
130.	Sapphire, ,,	24·97 ,,
131.	Amethyst, ,,	8·92 ,,
132.	Zircons, ,,	3 oz.
133.	Topaz and quartz, Rocky River, Uralla, N.S.W.	27·87 grms.
134.	Zircon sand, ,,	106·5 ,,
135.	Zircons (5 specimens), ,, ,,	6·07 ,,
136.	Zircon, ,,	1·05 ,,
137.	Obsidian bomb, Pond's Creek, county Gough, N.S.W.	14·3 ,,
138.	,, Uralla, ,,	41·5 ,,

995. Specimens from the old Gold workings near Mittagong, about 70 miles south of Sydney.

139. White flint, Mittagong, N.S.W.
140. ,, ,,
141. Brown flint, ,,
142. Quartz, quartzite, and sandstone, Mittagong, N.S.W. (8 specimens).
143. Jasper (5 specimens), ,,
144. Decomposed basalt, ,,
145. Conglomerate (2 specimens), ,,

		Weight.
146.	Pleonaste, zircon, &c., Nepean River, ,,	105·5 grms.
147.	Zircons, ,,	10·8 ,,
148.	Sapphire, particoloured, ,,	2·23 ,,

Diamonds and other gems are found associated with the above. The diamonds are of very good colour and quality, but no large ones have yet been discovered.

The deposits have a very great resemblance to those of Bingera, except that tourmaline and the nodules of limonite and of magnesite do not appear to be present. The associated flints closely resemble those from the chalk.

The deposit covers but a small area; it overlies and is surrounded by the Hawkesbury sandstone. It is not improbable that the gold and gems have been derived from the carboniferous conglomerate.

Very similar deposits are to be seen near Maryborough and other places in Queensland; these also doubtless contain diamonds.

996. Gems and other Minerals, chiefly from the New England District.

		Weight.
149.	Gem sand, New England, N.S.W.	54·13 grms.
150.	Zircon sand, Tallawang, county Bligh, N.S.W.	78 ,,
151.	Gem sand, Broadwater, Macquarie River, N.S.W.	3·33 ,,
152.	Black sand, Tuggerah Beach Lake, county Northumberland, N.S.W.	130·5 ,,
153.	Zircon (4 specimens), Bald Nob Creek, Glen Innes, ,,	5·73 ,,
154.	Topaz (rolled), 2 specimens, Scrubby Gully, New England	49·22 ,,
155.	,, 11 small specimens ,, ,,	12·2 ,,
156.	,, 7 crystals and 1 cleavage, Mole Tableland, Scrubby Gully, New England	36·55 ,,
157.	,, 9 specimens, Oban, New England, N.S.W.	13·8 ,,
158.	,, large crystal ,, ,,	27·92 ,,
159.	Crystallized topaz, greenish colour, well crystallized, Oban, New England, N.S.W.	12·3 ,,
160.	Crystallized topaz (white), Rocky River, New England, N.S.W.	9·04 ,,
161.	,, somewhat water-worn, Uralla, N.S.W.	9·95 ,,
162.	,, greenish, Uralla, N.S.W.	9·95 ,,
163.	,, ,, ,,	21·46 ,,
164.	,, ,, ,,	107·6 ,,
165.	,, ,, ,,	107·6 ,,
166.	Fragment of large green topaz, Gulgong, N.S.W.	263 ,,
167.	,, ,, ,,	371·75 ,,
168.	,, ,, ,,	371·75 ,,

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.—Gems and Precious Stones.

		Weight.
169.	Water-worn beryl, Scrubby Gully, Mole Tableland, New England	4·7 grms.
170.	Tourmaline, Barrier Ranges, N.S.W.	31·95 ,,
171.	,, (rolled), Scrubby Gully, Mole Tableland, New England	8·91 ,,
172.	Beryl, Carr's Lode, Gulf, New England, N.S.W.	10 oz.
173.	Water-worn beryl, Emmaville, ,,	20·82 grms.
174.	Barklyite, var. of ruby, Rocky River, Uralla, N.S.W.	3·72 ,,
175.	Coarse sapphire, Severn River, New England, N.S.W.	12·61 ,,
176.	,, Uralla, N.S.W.	4·94 ,,
177.	Green sapphires (5), ,,	1·735 ,,
178.	Zircons (5), ,,	2·735 ,,
179.	Colourless zircons (5), ,,	5·403 ,,
180.	Rough ,, ,,	4·457 ,,
181.	Brown sapphires (9), ,,	6·655 ,,
182.	Zircons, ,,	32·989 ,,
183.	Rough zircons, ,,	12·987 ,,
184.	,, ,,	13·835 ,,
185.	,, ,,	4·527 ,,
186.	Crystallized zircons (2), Uralla, N.S.W.	10·935 ,,
187.	Topaz vein, Inverell, New England, N.S.W.	49·54 ,,
188.	Topaz, Shoalhaven River, ,,	119 ,,
189.	Axinite, Bowling Alley Point, New England, N.S.W.	10 oz.
190.	Garnets, Oberon, N.S.W.	69 grms.
191.	,, in chlorite, Glen Creek, N.S.W.	6½ oz.
192.	,, 6 specimens, Barrier Ranges, N.S.W.	43·85 grms.
193.	Garnet, with calcite, quartz, and hornblende, Broken Hill, N.S.W.	185 ,,
194.	Garnets and idocrase, Bowling Alley Point, N.S.W.	8¼ oz.
195.	Garnet (massive), granular red brown, Broken Hill, N.S.W.	185 grms.
196.	Calcite with garnet and augite, Broken Hill, N.S.W.	139 ,,
197.	Garnet, small imperfect crystal, intersected by quartz, Broken Hill, N.S.W.	121 ,,
198.	Garnets (6 specimens), Moonbi, Peel River, N.S.W.	1·35 ,,
199.	,, (4 ,,), Swan River, near Glen Innes, N.S.W.	1·87 ,,
200.	Quartz, with imperfect crystal of brown garnets, Broken Hill, N.S.W.	147 ,,
201.	Epidote, Oberon, N.S.W.	43·3 ,,
202.	Idocrase or epidote, Emmaville, N.S.W.	89 ,,
203.	,, ,, ,,	11·05 ,,
204.	Fibrolite, Barrier Ranges, N.S.W.	52·2 ,,
205.	Staurolite, ,, ,,	20·58 ,,
206.	,, with garnet in mica schist, Broken Hill, N.S.W.	313 ,,
207.	Wollastonite, Oberon, N.S.W.	9·41 ,,
208.	Pectolite, replacing spirifers, Wallerawang, N.S.W.	
209.	Feldspar, Louisa Creek, N.S.W.	3·02 ,,
210.	Quartz crystallized, 3 specimens, Louisa Creek, N.S.W.	4·07 ,,
211.	,, 3 specimens	5·17 ,,
212.	,, green colour, 2 specimens	29·4 ,,
213.	Quartz crystals, Nundle, N.S.W.	5·56 ,,
214.	Group of quartz crystals, Dutchman Tin Mine (100 ft. level), Vegetable Creek, N.S.W.	14¼ lb.
215.	Hyalite in serpentine, 3 pieces	4¼ oz.
216.	Opal in matrix, Abercrombie River	15¼ ,,
217.	,, ,, ,,	2¼ ,,
218.	,, Bulloo River, Queensland, to compare with the foregoing	33¼ ,,
219.	,, ,, ,, ,,	9 ,,
220.	,, ,, ,, ,,	1 lb. 15 ,,
221.	,, ,, ,, ,,	1 lb. 15½ ,,
222.	,, ,, ,, ,,	5 lb. 2½ ,,
223.	Chabasite	5¾ ,,
224.	Heulandite, red	1·67 grms.
225.	Natrolite, New England, N.S.W.	13·16 ,,
226.	,, ,, ,,	43· 6 ,,

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.—Gems and Precious Stones.

		Weight.
227.	Albite, N.S.W.	37 grms.
228.	Gmelinite	11·28 „
229.	Analcite	67·22 „
230.	Laumonite, pink	4¾ oz.
231.	Marmolite (3 specimens), New Reform Mine, Lucknow, N.S.W.	248 grms.
232.	Graphic granite, Broken Hill, N.S.W.	184 „
233.	Auriferous cement, Kiandra, N.S.W.	44 „
234.	Prehnite, 3 specimens	34·31 „
235.	Halloysite	24·46 „
236.	Alunite (2 specimens), Bulladelah, N.S.W.	14½ oz.
237.	Geyserite, containing plant remains, Richmond River, N.S.W.	
238.	„ „ Monaltrie, Richmond River, N.S.W.	

239. Meerschaum—so called, Monaltrie, Richmond River, N.S.W.

Analysis.

Water, given off at 100°	3·28
Combined water (loss on ignition)	4·34
Insoluble silica	51·35
Soluble silica	·11
Alumina	37·72
Iron sesquioxide	·46
Lime	·34
Magnesia	1·25
Alkalies	traces
Carbonic acid	1·54
	100·39

240. Flint, Ugi, Solomon Islands.
241. „ (2 specimens), Ugi, Solomon Islands.
242. „ (2 „) „ „
243. Chalk Flints (3 specimens), Ugi, Solomon Islands.
244. Zoisite, Bingera, N.S.W.
245. Turquoise, „
246. Silica, diatomaceous earth, Richmond River, N.S.W.

247.	Fluorspar, Woolgarloo Lead Mines, Yass, N.S.W.	8¼ oz.
248.	Calcite, crystallized, Lobb's Hole, Hay, N.S.W.	12¾ „
249.	„ „ „ „	1 lb. 6½ „
250.	„ greenish, in flattened rhombohedrons	19·9 grms.
251.	„ crystallised in flattened rhombohedrons, Broken Hill.	
252.	„ resembling prehnite, Silverton, N.S.W.	
253.	Carbonate of lime (impure), cone-in-cone structure, Picton, N.S.W.	11¾ oz.
254.	Veins of Calcite and Asbestos, Lucknow, New England, N.S.W.	
255.	Chalk, New Britain Group (see Pamphlet)	4¾ „
256.	Lignite, Kiandra, N.S.W.	
257.	Sulphur (native), 5 miles inland, Port Paterson, New Hebrides.	
258.	„ Mount Wingen, New England, N.S.W.	
259.	Gypsum, Buckwaroon, near Cobar, N.S.W.	7¾ „
260.	„ group of radiated crystals, Buckwaroon, near Cobar, N.S.W.	
261.	Aragonite, invested with brown hæmatite, Broken Hill, N.S.W.	
262.	Barytes and quartz, Sunny Corner, Mitchell's Creek, Wallerawang	1 lb. 3½ „
263.	„ in crevices in sandstone, Marrickville, Sydney, N.S.W.	
264.	Contorted shale, Peelwood.	
265.	Cast-iron acted upon by sea-water, with analysis.	
266.	„ „ „	
267.	Fragment of tree embedded in basalt, Inverell, with diagram and analysis.	

Specimens from Sunny Corner Silver Mine, Mitchell's Creek, N.S.W. (See Pamphlet.)

268. Rock with pyrites crystals, Sunny Corner, N.S.W.
269. Decomposed rock with pyrites crystals, "spotted rock" of the miners, Sunny Corner, N.S.W.
270. Rock with pyrites nodule, Sunny Corner, N.S.W.
271. Pyrites nodule ,, ,,
272. ,, ,, ,,
273. Pyrites nodules undergoing decomposition, Sunny Corner, N.S.W.
274. ,, ,, ,, ,,
275. Honeycomb siliceous structure filled with oxide of iron, derived from the decomposition of the pyrites, Sunny Corner, N.S.W.
276. } Spotted rock containing siliceous honeycomb portion of nodule, the sulphide of iron
277. } having been removed (see figure in Pamphlet), Sunny Corner, N.S.W.
278. Honeycomb siliceous structure, Sunny Corner, N.S.W.
279. ,, ,, ,, ,,
280. ,, ,, ,, ,,
281. ,, ,, ,, ,,
282. ,, ,, ,, ,,
283. Stalactite of brown oxide of iron.
284. Silver ore, averages about 80 oz. silver per ton, Sunny Corner, N.S.W.
285. Slate rock, bounding the silver-bearing veins.

997. Specimens of Jet, "Kerosene Shale," &c., from Joadja Creek, N.S.W.

286. Specimen of jet, occurring with "kerosene shale," Joadja Creek, N.S.W.
287. ,, ,, ,,
288. ,, ,, ,,
289. Piece of shale, to show conchoidal fracture, Joadja Creek, N.S.W.
290. ,, ,, ,, ,,
291. ,, ,, ,, ,,
292. ,, ,, ,, ,,
293. Inkstand of "shale," Joadja Creek, N.S.W.
(See Pamphlet for analyses of the so-called "kerosene shale."
294. Oil shale, Wollongong, N.S.W.
295. Graphite, Undercliff Station, Wilson's Downfall, New England.
296. ,, ,, ,,

998. Meteorites.

1. Baratta meteorite, fragment of, N.S.W.
2. ,, ,, cut and polished.
3. ,, microscope slide.
4. ,, pamphlet upon.
5. Models, Bingera meteorite, (3), N.S.W.
6. Pamphlet on Bingera meteorite.
7. Etched portion of meteorite, from Thunda, Queensland, with six photographs of the original.

999. Metalliferous Minerals.

	Weight.
1. Rutile, acicular crystal, running through quartz crystal, Tingha, N.S.W.	17·15 grms.
2. Rutile, acicular crystal running through quartz crystal (cut and polished), Tingha, N.S.W.	5·67 ,,
3. Brookite, rolled fragment, Burrandong, N.S.W.	1·397 ,,
4. ,, ,, ,,	·487 ,,
5. Nigrine, ,, ,,	·845 ,,

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.—Metalliferous Minerals.

		Weight.
6.	Scheelite, Victoria Reef, Adelong, N.S.W.	1 lb. 15¼ oz.
7.	Wolfram, The Gulf, New England, N.S.W.	8 „ 13 „
8.	Molybdenum ochre, New England, N.S.W.	29·89 grms.
9.	Molybdenite and Molybdenum ochre, near Uralla, N.S.W.	81· 5 „
10.	„ Elsmore, New England, N.S.W.	7 oz.
11.	„ crystals, Kingsgate, Glen Innes, „	47 grms.
12.	„ Bismuth Mine, Kingsgate, Glen Innes, „	543 „
13.	Chromite (2), Bowling Alley Point, near Nundle, N.S.W.	1 lb. 13½ oz.
14.	„ „ „ „	1 „ 9½ „
15.	Mispickel, Ottery Mine, Tent Hill, „	7 „ 5 „
16.	„ crystallized „	39·04 grms.
17.	Arsenio-calcite, Louisa Creek, New England, „	10·05 „
18.	Pharmacolite, $H_2CaAsO_4 5H_2O$, Louisa Creek, New England	·081 „
19.	Native antimony in calcite, Lucknow, New England, N.S.W.	1 lb. 12 oz.
20.	„ with zinc blende,&c., Lucknow, New England, N.S.W.	1 „ 11 „
21.	„ mispickel, calcite, gold and silver, Lucknow, New England, N.S.W.	4 „
22.	Tetradymite, telluride of bismuth, containing gold and silver	155 grms.
23.	Native bismuth and fluorspar, Kingsgate, near Glen Innes, N.S.W.	12¾ oz.
24.	Bismuth ochre (2 specimens), „ „ „	409 grms.
25.	Zinc blende, or Gahnite, Tenterfield, N.S.W.	8¼ oz.
26.	Zinc spinel, Tenterfield, N.S.W.	20·65 grms.
27.	„ „	94 „
28.	Tin stone, fine brown crystal in quartz, Jinjellic, S. District	11 lb. 1 oz.
29.	Cassiterite crystals, disseminated through large quartz crystals, Newstead Mine, New England	6 „ 6 „
30.	Quartz Crystals, containing scattered cassiterite crystals, Newstead Mine, New England, N.S.W.	6½ lb.
31.	Cassiterite crystals, disseminated through large quartz crystals, Newstead Mine, New England	1 „ 8½ „
32.	„ „ Albion Mine, New England	45 7 grms.
33.	„ „ Bolitho Mine, „	4 lb. 10 oz.
34.	„ „ stream tin, Elsmore, Inverell, N.S.W.	12¼ „
35.	Cassiterite, twin crystals, Bolitho Mine, New England	5¼ „
36.	„ crystallized, „ „	24·48 grms.
37.	„ „ (3 specimens), Elsmore, Inverell, N.S.W.	4¼ oz.
38.	Iridiscent tinstone, Poolamacca, near Silverton, N.S.W.	10·99 grms.
39.	Wood tin, New England, N.S.W.	39·6 „
40.	Ruby tinstone, Inverell, N.S.W.	15·5 „
41.	Tinstone in amethystine quartz, Bark Hut Creek, Emmaville, N.S.W.	51·1 „
42.	„ finely divided, in quartz, Ballandean, Tenterfield, N.S.W.	7½ oz.
43.	„ conglomerate, Karaula Mine, Inverell, N.S.W.	538· 5 grms.
44.	„ with beryl, chalcedony, agate, &c., Gulf, New England, N.S.W.	9½ oz.
45.	„ associated with topaz, Vegetable Creek, N.S.W.	1 lb. 8¾ „
46.	Native lead, Gundagai, N.S.W.	32·1 grms.
47.	Crystallized cerussite (lead carbonate), Broken Hill Mine, Silverton	1 lb. 8¼ oz.
48.	„ „ „	12 „
49.	„ „ „	10 „
50.	Crystallized cerussite (lead carbonate), Broken Hill Mine, Silverton (5 crystals).	
51.	Crystallized cerussite (lead carbonate), Broken Hill Mine, Silverton	9½ „
52.	Crystallized cerussite, North Wiseman's, Bathurst, N.S.W.	6½ „
53.	Anglesite (lead sulphate), Umberumberka Mine, Silverton	2 lb. 12 „
54.	Lead Sulphate, crystallised on cellular siderite, Broken Hill, N.S.W.	185 grms.
55.	Galena, enclosing black mica, Broken Hill, N.S.W.	185 „
56.	Argentiferous galena, Gipsy Girl, Thackaringa, near Silverton	13½ oz.
57.	Oxide of manganese, near Armidale, New England	10¾ „
58.	Diallogite, manganese carbonate, Webb's Mine, Emmaville, N.S.W.	21· 8 grms.
59.	Pyrrhotite, Ottery Tin-mine, Emmaville, N.S.W.	66· „
60.	„ „ „	42·7 „
61.	Hæmatite, pseudomorphous, after cubical pyrites, Carwell	2 41 „

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.—Metalliferous Minerals.

		Weight.
62.	Hæmatite, crystallized, Carwell	3·64 grms.
63.	Vivianite, N.S.W.	3·92 „
64.	„ „ „	8·87 „
65.	Magnetite, imperfect crystal, near Corowa Station, Barrier Range, N.S.W.	194 „
66.	Magnetite, showing slickenside, near Scone, Page and Isis River, N.S.W.	120 „
67.	Iron pyrites, showing conchoidal fracture, New England	9·31 „
68.	„ „ „	63·8 „
69.	„ foliated crystals, Scone, N.S.W.	22·54 „
70.	Ilmenite (titaniferous iron), Uralla, N.S.W. (see analysis, Minerals of N.S.W., p. 101)	78 „
71.	Löllingite, iron and arsenic ($FeAs_2$), 3 specimens, Barrier Range, N.S.W.	26·22 „
72.	Löllingite ($FeAs_2$), Louisa Creek, N.S.W.	3·87 „
73.	Limestone, containing siderite, $FeCO_3$. Fe.=10 p.c., Jamberoo, N.S.W.	1 lb. 12 oz.
74.	Cobalt ore, Carcoar, Co. Bathurst, N.S.W.	4½ lb.
75.	Native copper, crystallized, Cobar, N.S.W.	4¼ oz.
76.	„ in fine grains in basalt, Kiama, N.S.W.	4½ „
77.	„ in lithomarge, Blayney, N.S.W.	1 lb. 0¾ „
78.	Chessylite in fluorspar, Cobar, N.S.W.	9 „
79.	„ crystallized, „	7¾ „
80.	„ „ „	6 „
81.	„ „ „	9½ „
82.	„ „ „	96·4 grms.
83.	„ crystal, Cobar, N.S.W.	42·4 „
84.	„ „ „	29·8 „
85.	Azurite and lead carbonate, North Wiseman's, Bathurst	1 lb. 6¼ oz.
86.	„ malachite, &c., in gossan, Winter's Reef, Wallerawang, N.S.W.	38·4 grms.
87.	Cuprite crystal, coated with malachite, Cobar, N.S.W. (3 specimens)	10·9 „
88.	„ and quartz, Broken Hill Mine, Silverton	108·9 „
89.	Iridescent galena with fahlerz, Webb's Mine, Emmaville	4 lb. 3 oz.
90.	Fahl ore, crystal, Webb's Mine, Emmaville	2 „ 4 „
91.	„ with galena, „ „	8 „
92.	„ North Wiseman's, Bathurst	51·4 grms.
93.	„ 2 specimens, North Wiseman's, Bathurst	86 „
94.	Siliceous redruthite, Carcoar, N.S.W.	1 lb. 1½ oz.
95.	Atacamite, Cobar, N.S.W.	17·6 grms.
96.	Chrysocolla, Broken Hill Mine, Silverton	59·8 „
97.	Native silver and silver chloride, 2 specimens, with galena, siderite, and cerussite, Umberumberka Mine, near Silverton, 240 ft. level	8 lb. 6 oz.
98.	Silver chloro-bromide, crystals, Silverton, N.S.W.	2 „ 6½ „
99.	Silver chloride, crystals, Silverton, N.S.W.	6 „
100.	„ chloro-bromide, crystals, Silverton, N.S.W.	31·64 grms.
101.	„ with kaolin, Broken Hill, N.S.W.	69 „
102.	„ with kaolin, Broken Hill, N.S.W.	48 „
103.	„ „ 155 ft. level, Silverton, N.S.W.	11½ oz.
104.	„ on psilomelane, Silverton, N.S.W.	1 lb. ¼ „
105.	„ crystallised, green, North May Bell Silver Mine, Silverton, N.S.W.	13½ „
106.	„ crystallised, green, Day Dream Mine, Silverton, N.S.W.	6 „
107.	„ „ Silverton, N.S.W.	4¼ „
108.	„ massive, containing bromide and iodide, Silverton, N.S.W.	2 lb. 2 „
109.	„ with lead carbonate, lode ore 4 ft. thick, 700 ft. level, Silverton, N.S.W.	2 „ 9 „
110.	„ veins, War Dance Mine, Silverton, N.S.W.	1 „ 4½ „
111.	„ crystallized on cerussite, Broken Hill, N.S.W.	373 grms.
112.	Redruthite, silver-bearing, 100 ft. level, „ „	6½ oz.

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291 : Collections of Minerals, Ores, &c.—Metalliferous Minerals.

		Weight.
113.	Silver chloride with chessylite, Hen and Chickens Mine, Silverton N.S.W.	11¾ grms.
114.	„ with copper sulphide and garnets (212 ft. level)	13½ „
115.	„ massive piece, Lubra Mine, Barrier, N.S.W.	268 „
116.	„ with Galena, Broken Hill, N.S.W.	66 „
117.	Silver iodide (iodargyrite) on brown hæmatite, Silverton, N.S.W.	2 lb. 15 oz.
118.	Silver Sulphide in quartz, Wollombi, Armidale, N.S.W.	329 grms.
119.	Veinstone, Silverton, N.S.W.	7 oz.

Note.—From 97 to 119 inclusive were collected by Mr. J. McGarvie Smith, Sydney.

1000. Mineral Specimens from New Caledonia.

1. Garnierite. Hydrated silicate of nickel and magnesia (first specimen analysed), New Caledonia. (See pamphlet.) — Weight. 113 grms.

Analysis.

Water	5·266
Silica	47·236
Nickel oxide	24·010
Alumina and iron oxide	1 668
Lime	traces
Magnesia	21 660
Loss	·360
	100·000

2. Noumeaite. Hydrated silicate of nickel and magnesia, pale green, tough variety, Bel 'Air Mine, Ouaïlou, New Caledonia — 252 grms.

Analysis.

Water at 100° C	11·28
„ combined by difference	10·37
Silica	50·15
Alumina and iron oxide	·57
Nickel oxide	10·20
Magnesia	17·43
	100·00

3. Noumeaite, pale coloured, Mount Koghi, New Caledonia — 6¾ lb.

4. „ rich, showing slickenside „ — 330 grms.

5. „ New Caledonia — 181 „

6. „ dark green, brittle, Nakety, New Caledonia — 7·42 „

Analysis.

Water at 100° C	6·44
Combined Water by difference	11·53
Silica	38·35
Alumina	·40
Iron sesquioxide	·15
Nickel protoxide	32·52
Magnesia	10·61
	100·00

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291: Collections of Minerals, Ores, &c.—Metalliferous Minerals.

		Weight.
7.	Noumeaite, with serpentine, New Caledonia	1196 grms.
8.	Asbolite, earthy cobalt ore, New Caledonia	152 „
9.	„ „ „ „	258 „
10.	„ „ „ „	260 „
11.	„ „ „ „	4 lb.

Analyses of Nodules of the Cobalt Ore from Unia.

Specimen	No. 1.	No. 2.	No. 3.	No. 4 Coumac.
Water lost at 100° C	8·68	10·19	10·54	2·86
„ combined	8·87	9·74	9·83	16·57
Silica	15·34	15·15	17·20	1·06
Alumina	8·86	8·70	7·65	11·37
Iron sesquioxide	10·41	10·26	5·51	23 52
Chromium sesquioxide	·52	·51	·87	traces
Nickel oxide	traces	traces	traces	32·41
Cobalt „	15·67	15·43	13·59	absent
Manganese peroxide (MnO_2)	11·52	9·57	12·05	10·42
Lime	traces	traces	traces	absent
Magnesia	20·80	20·46	22·63	1·79
	100·67	100·01	99 87	100·00

Specimen from Baie des Pirogues.

Water lost at 100° C	6·072
Combined water, by difference	13·759
Silica with traces of chrome iron	4·476
Alumina	21·529
Iron sesquioxide	18·396
Chromium sesquioxide	traces
Manganese peroxide (MnO_2)	27·588
Cobalt oxide	4·927
Nickel oxide	2·256
Lime	traces
Magnesia	·418
Potash	·123
Soda	·216
Phosphoric acid (P_2O_5)	·240
	100·000

		Weight.
12.	Glaucophane, with garnets, New Caledonia	716 grms.
13.	„ „ (see pamphlet), New Caledonia	10·72 „

Analyses.

	I.	II.	Mean.
Water	1·42	1·34	1·38
Silica	52·71	52·88	52·79
Alumina	14·20	14·69	14·44
Iron protoxide	9·89	9·76	9 82
Manganese	traces	traces	traces
Lime	4·31	4·27	4·29
Magnesia	11·12	10·92	11·02
Potash	·95	·80	·88
Soda	5·15	5·38	5·26
	99·75	100·04	99·88

Sp. gr., 3·12.

Department E.—Mines, Mining, and Metallurgy.

Group XLII—Classes 290 and 291 : Collections of Minerals, Ores, &c.—Metalliferous Minerals.

14. Mica, accompanying Glaucophane, New Caledonia ..... Weight. 92 grms.

Analysis.

Water, combined	4·31
Silica	50·60
Alumina	25·28
Iron protoxide	3·47
Manganese protoxide	0·50
Lime	1·04
Magnesia	4·86
Potash	6·69
Soda	2·49
Loss	0·76
	100 00

Neither lithium nor fluorine were present.

Analyses.

	I.		II.		Mean of two analyses.
Water, combined	4·42	...	4·50	...	4·46
Silica	51·22	...	51·23	...	51·23
Alumina	27·29	...	27·41	...	27·35
Iron protoxide	2·45	...	2·75	...	2·60
Manganese	·34	...	—	...	·34
Lime	1·25	...	—	...	1·25
Magnesia	3·82	...	—	...	3·82
Potash	—	...	6·93	...	6·93
Soda	—	...	1·27	...	1·27
					99·25

15. Garnets, with Glaucophane, New Caledonia..... 11·8 grms.

Analyses.

	I.		II.		Mean.
Silica	38 10	...	38.21	...	38·15
Alumina	22·09	...	22·27	...	22.18
Iron protoxide	21·17	...	21·35	...	21·26
Manganese ditto	5 50	...	5 58	...	5·54
Lime	7·88	...	7·68	...	7·78
Magnesia	4·64	...	4·84	...	4·74
Loss on ignition	0·33	...	0·29	...	0·31
	99·71	...	100·22	...	99·96

Group XLIII.—Mineral Combustibles, Coal, Coke, Petroleum, Natural Gas, &c.

CLASS 292.—Coal—Anthracite, Semi-bituminous, and Bituminous; Coal Waste, "Slack," Coke, and Pressed Coal.

COAL.

The total production of coal in New South Wales to the 31st December, 1891, was 53,850,743 tons; value, £25,809,040.

The coal-bearing strata of New South Wales belong to three distinct systems. These systems have been summarized by Prof. T. W. E. David, B.A., F.G.S., late Geological Surveyor, Department of Mines, N.S.W., in a Paper read before the Australasian Association for the Advancement of Science, 1890, from which the following notes are taken:—

1st System.—Probably of Lower Carboniferous age and not yet proved to contain workable seams. Two seams, however, 5 feet and 7 feet thick respectively, occur near the top of this system, but the coal in both is too dirty and full of bands to be marketable. Both of these seams occur in the *Rhacopteris* Series overlying the *Lepidodendron* beds, of which, however, they form a part, and this series is separated by a vast interval of time, as evidenced by a strong break in the flora, from the overlying Permo-Carboniferous System.

2nd System.—The Permo-Carboniferous System, which comes next in order, and which is characterised by a predominance of *Glossopteris* in the flora, is extensively developed in New South Wales and Queensland. Productive coal measures occur in this system on three horizons in New South Wales, and on two horizons in Queensland. These three coal-bearing horizons in New South Wales are—

1. First and lowest, the Greta (Stony Creek) Series.
2. The Tomago (East Maitland) Series.
3. Last and uppermost, the Newcastle Series.

The total thickness of this system and its associated strata at Newcastle is about 11,000 feet, containing a total thickness of about 150 feet of coal, without taking into consideration seams less than 3 feet thick.

With the exception of the small outlying coalfield of the Ward's River, near Stroud, this system is geologically united to form a single vast coalfield, extending from Bateman's Bay on the south to Port Stephens on the north; thence sweeping inland under the Blue Mountains to the Talbragar River; thence tending northerly to the Queensland border, where it dips under the newer Rolling Downs Formation; and does not re-appear until the head of the Dawson River is reached in Central Queensland, where the equivalent of the Newcastle or Tomago Measures are met with, and further north, near the junction of the Isaacs River with the Mackenzie, the Greta Coal-measures are exposed.

The Permo-Carboniferous coalfields of New South Wales are nine in number, as follows:—

1. The Hunter River (Northern).
2. The Ward's River.
3. The Sydney.
4. The Illawarra (Southern).
5. The Mittagong (South-western).
6. The Blue Mountain (Western).
7. The Dubbo.
8. The Namoi.
9. The Gwydir River.

3rd System.—The close of the Permo-Carboniferous Period in New South Wales is marked by a strong break in the flora, indicating a vast interval of time. The rocks of the system which succeeds are all characterised by the predominance of *Tæniopteris* and *Thinnfeldia*.

Near Sydney, this system comprises the Wianamatta Shales, the Hawkesbury Sandstone, and the Narrabeen Shales, but it is only in the first-named series that coal seams of any thickness are known to occur, and none of these are workable. In the Clarence District, however, there are several seams belonging to this system, which may be of sufficient thickness, and of sufficiently good quality, to be worked for local use.

The principal coal-beds exist along the coast to the north and south of Sydney, and on the Great Northern, Great Western, Great Southern, Illawarra, and Narrabri Railway Lines, also in the Clarence District. The mines first opened are situated in the immediate vicinity of Newcastle, and it is from there that the Colony obtains its largest supply. In many districts the coal crops out on the face of the hills, and can be cheaply got by driving tunnels. The coal-shipping facilities at Newcastle are by staiths and steam and hydraulic cranes. Full descriptions of the various coal-seams worked in New South Wales have been given by Mr. John Mackenzie, F.G.S., Government Examiner of Coal-fields, in the "Annual Reports of the Department of Mines," and in the "Mineral Products, &c., of New South Wales," 2nd edition, 1887. Writing of the Coal Measures in the Western district, the Government Geologist (Mr. C. S. Wilkinson, L.S., F.G.S.) says:—"They are 480 feet thick, resting comformably on the marine beds of the Lower Coal Measures, and overlaid by more than 500 feet of Hawkesbury sandstone. In Lithgow Valley the seam worked, which is 10 feet thick, and is the lowest in the series, lies about 25 feet above the marine beds, and is the same seam worked in the different collieries. This seam of coal crops out on the surface of the railway line at Lithgow. It dips at a low angle of 3 to 5 degrees to the north-east, and is therefore easily worked; and as it passes under the vast extent of mountain ranges to the north and east, it will be inexhaustable for generations to come." The No. 1, or uppermost seam, is worked at the Katoomba and Hartley Vale collieries, and has been opened out near Mount Victoria, Mount Wilson, and between the Zig Zag and Mount Clarence. The production of coal has increased very rapidly of late years. In 1833, 328 tons was raised, and in 1891, 4,037,929 tons.

PETROLEUM OIL CANNEL COAL (KEROSENE SHALE).

Petroleum Oil Cannel Coal occurs in the Coal Measures. At Greta or Anvil Creek it forms irregular layers, sometimes over 6 inches thick, in the main bituminous coal-seam; also at America Creek, in one part of the mine, the seam of kerosene shale was found to change into bituminous coal; but at the Joadja Creek and Hartley mines it forms distinct seams, attaining a maximum thickness of 5 feet in the latter mine.

Kerosene Shale also occurs near Gulgong, Murrurundi, and several other localities. An extensive deposit has been recently found at Capertee, near the line of railway, from Wallerawang to Mudgee, and is being worked by the Genowlan Shale Company. "It has unquestionably resulted," says the late Rev. W. B. Clarke (writing upon the origin of shale), "from the local deposition of some resinous wood, and passes generally into ordinary coal, many portions of the same bed in the Illawarra mines exhibiting the impress of fronds of *Glossopteris* as plainly as they are shown in ordinary coal shale." * * * "Presuming that the origin above suggested is correct, viz., the occasional occurrence in the ancient deposits of trees of a peculiar resinous constitution, there is no anomaly in finding in one spot a mere patch amidst a coal-seam (as in the case of Anvil Creek or the Hunter River), or thick-bedded masses of greater area, as in the coal-seams of Mount York or of America Creek, in the Illawarra, depending upon the original amount of drift timber." In a paper read before the Linnean Society of New South Wales on 26th June, 1889, Prof. T. W. Edgeworth David, B.A., F.G.S., attributes the origin of Kerosene Shale, as evidenced by its microscopic structure, to the local accumulation of sporangia—either land or aquatic plants.

The shale yields on an average about 150 gallons of crude oil per ton, which contains over 60 per cent. of refined kerosene oil, and the remaining products consists of gasoline, benzine, spongaline, paraffin, wood-preserving composition, and lubricating oil.

Its gas-producing capabilities amount to the large yield of over 18,000 cubic feet of gas, with an illuminating power of thirty-eight to forty candles. On this account it has been found advantageous for mixing with ordinary coal in the manufacture of gas.

Department E.—Mines, Mining, and Metallurgy.

Group XLIII—Class 232: Coal, &c.

* NEWCASTLE HARBOUR, AND ITS FACILITIES FOR SHIPMENT.

Newcastle, in the county of Northumberland, the trade of which is second only to that of Sydney, owes its great commercial importance to the different coal mines which have been opened out close to and within 32 miles of the harbour.

On the south or town side of the harbour there is a continuous line of wharf 3,600 feet long belonging to the Government, 1,470 feet of which is occupied by four steam cranes for the shipment of coal, 660 feet for cargo berths for deep draught vessels, 500 feet reserved for the Sydney passenger steamers (owing to the increased size of the new boats put on the Sydney passenger service this wharf has lately been considerably increased in length and width), 400 feet is used as a general cargo wharf, including a lumber berth for loading vessels with timber, and 570 feet for shipment of coal with four shoots. The whole length of the wharf is lit with gas.

At Bullock Island, on the western side of the harbour, a substantial timber Government wharf, 6,293 feet in length, has been constructed along the face of what was formerly known as the ballast dyke ; 4,493 feet of this wharf is set apart chiefly for the shipment of coal. The loading is performed by hydraulic cranes, of which there are eight erected and four in course of construction—six being 15-ton cranes, capable of shipping 1,000 tons of coal each in 12 hours, and two 25-ton cranes, which can be used for discharging heavy machinery, &c., when necessary. Ships of the largest class can load under the hydraulic cranes and proceed to sea through deep-water channels recently dredged. There are also three 50-feet ballast jetties 200 feet apart. It is proposed to spend immediately a sum of £50,000 to further increase the shipping facilities at Bullock Island. Some 2,000 feet of wharf will be erected as a commencement of a 90-acre basin inside the present wharf, which (basin) it is intended to dredge to a depth of 25 feet, where vessels will be able to lie in slack water, and the whole will be lit up with the electric light. The remainder of this wharf is used by vessels discharging ballast, copper, and other ores, or general cargo. A branch double line of railway connects the wharf with the Great Northern railway, and along the back of the wharf is laid a very extensive system of sidings and standage room for working the coal traffic. Each crane has a full and empty line of railway, and lifts the coal waggons of 6 to 10 tons, and, slewing them round, discharges the coal into the hold of the ship.

At Stockton, on the northern side of the harbour, a Government wharf, 600 feet long, with two 15-ton steam cranes, capable of shipping 1,000 tons of coal each in 12 hours, is completed.

* ILLAWARRA DISTRICT, AND ITS FACITITIES FOR SHIPMENT OF COAL.

The Wollongong Harbour and Basin is situated 45 miles south of Sydney Harbour, and at low tide there is a depth of 13 feet of water at its entrance and alongside the wharf, where there are three cranes capable of shipping 1,800 tons of coal per hour. The Belmore Basin has a depth of 17 feet of water at its eastern side, where there are four shoots, each capable of shipping 100 tons per hour ; but as only two vessels can load there at the same time, the largest quantity of coal shipped by them is 200 tons per hour, or 2,000 tons per day. The largest steamships which have coaled at the harbour are the "Barrabool" and "Wentworth," drawing 15½ feet of water, and carrying 900 tons, and the largest sailing vessel took away 700 tons.

In addition to the Government appliances for shipment of coal at Wollongong, the Coalcliff, Bulli, North Illawarra, and Mount Kembla Companies have jetties of their own, from which coal is sent by steam colliers to Port Jackson and elsewhere.

The Coalcliff jetty has a depth of 18 feet of water at high tide, and 14 feet at low tide, and can ship 100 tons per hour. They have two steam colliers carrying 250 tons each, and the greatest quantity of coal shipped per day has been 520 tons.

The Bulli jetty has a depth of 26 feet of water at the shoots, which are capable of discharging 120 tons of coal per hour each, into steam colliers, of which they have three. The largest carries 700 tons, and the others 500 and 300 respectively.

The North Illawarra Coal Company have completed a fine jetty, 870 feet in length, which has 26 feet of water at their shoot at high tide, and they can ship about 120 tons per hour.

The Mount Kembla jetty has a depth of 26 feet of water at their shoot at low tide, and the company can ship about 120 tons per hour therefrom, and have sent away 1,472 tons in a day. The largest ship that has loaded from it is the "Titus," with 1,000 tons of coal, and drawing 17½ feet of water.

* "The Collieries and Boghead Mineral of New South Wales," by John Mackenzie, F.G.S., Examiner of Coal-fields. The sections accompanying the following entries, with two exceptions, have been taken from this work.

Department E.—Mines, Mining, and Metallurgy.

Group XLIII—Class 292: Coal, &c.

* THE WESTERN COLLIERIES AND THEIR RAILWAY AND SHIPPING APPLIANCES.

All the western collieries are adjacent to, or within a short distance of, the Great Western Railway, and they have for many years had the supplying of coal to the Government railway locomotives, &c. Their coal meets with a ready sale for manufacturing, household, and other purposes in all the suburban and inland towns, and large quantities of slack are sold for brick and tile making.

Appliances will shortly be completed, and ready for use, for the shipment of coal at Darling Harbour, Sydney, at its junction with the Great Western Railway.

1001. ABRAM COAL-MINING COMPANY, 63, Pitt-street, Sydney.

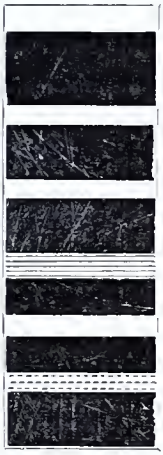
Cannel Coal from Abram Colliery, near Maitland.

1002. AUSTRALIAN AGRICULTURAL COMPANY, Newcastle.

Section of Coal from the Borehole coal-seam.

Worked by the Australian Agricultural Company from under their 2,720 acres of freehold and leasehold land at a depth of 200 ft. at their Hamilton pit near Newcastle, and about two miles by their railway from Newcastle Harbour. It averages 10 ft. 6 in. in thickness. It is very free from faults, lies very regular, dips about 1 in 40 south-east, and has a specific gravity of 1·28. This Company's appliances for haulage, drainage, and ventilation of the mine, comprise all the latest improvements; and it is the only colliery that has a Guibal Fan in place of an underground furnace for ventilation purposes. 387,074 tons of round and small coal, valued at £184,750, were raised in 1886; and 803 men and boys were employed underground, and 172 above ground daily, when the colliery was at work; and the total quantity of air produced in the mine by the Guibal Fan is from 90,000 to 112,000 cubic feet per minute. They have appliances for an output of 1,600 tons of round and small coal per day of 8½ hours.

Section of Coal taken from Hart's Heading, 17th June, 1892, Australian Agricultural Company's No. 2 Pit. From actual measurement, and in the neighbourhood of where their Exhibit was procured.



	ft.	in.
Shale and gray post.		
Top band	4	0
Band	0	1
Top lift	3	5
Band	0	1
Bottom lift	2	2
Morgan	1	0
Four-inch	1	2
Band		1
Little tops	1	2
Jerry	1	5
Bottoms	3	6
Thickness of coal and bands..	18	1

1003. BROWN, J. & A., Newcastle.

Coal, showing full section of Borehole seam, as wrought at Brown's Duckenfield and Merthyr Collieries, owned by Messrs. James and Alexander Brown, Newcastle, N.S.W.

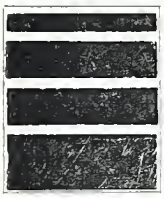
The property consists of about 5,000 acres of freehold land. The Borehole coal-seam, which is the only one worked on this property, is considered to be by far the best and

* "The Collieries and Boghead Mineral of New South Wales," by John Mackenzie, F.G.S., Examiner of Coal-fields. The sections accompanying the following entries, with two exceptions, have been taken from this work.

Department E.—Mines, Mining, and Metallurgy.

Group XLIII—Class 292: Coal, &c.

most valuable seam yet discovered in the Colony for house, gas, coking, and steaming purposes. The seam dips slightly to the S.W., and is almost undisturbed by faults. It is of the following section where the exhibit was taken from :—



	ft.	in.	
Coal-roof, "little tops"	..	..	(not sent away).
Clay parting	0	0½	to 0.
Bright bituminous coal	1	6	
Indurated clay band	0	0½	
Bright bituminous coal	1	6½	except upper portion, 4 in. thick, which is strong steaming splint coal.
Indurated clay band	0	0¾	
Bright bituminous coal	2	4¼	
Total thickness wrought	5	6½	

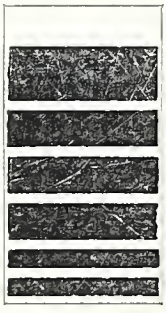
The gross output is about 1,500 tons of coal per day of eight working hours, about 800 hands being employed.

The coal seam is wrought by means of three adits driven into the hill side, through which the coal is drawn to the surface by a number of hauling engines, all working on the main rope prineipal.

The system of coal-mining adopted is that known as the "bord and pillar" system, about 60 per cent of the coal being got. Fire-damp (carburetted hydrogen gas) is very seldom met with, and even when given off the quantity is so small that the miners use naked lights, although the firemen make their examinations preceding the shifts with Davy lamps. The workings of the mine are divided into districts, so that for every seventy miners a separate current or "split" of pure air is provided, averaging about 200 cubic feet per man per minute. The total quantity of air in circulation is about 130,000 cubic feet per minute, produced by four large furnaces fixed below ground.

The coal is conveyed along the firm's private line, a distance of about 6 miles, to their private shoots alongside the Hunter River at Hexham, where vessels of large size are brought from Newcastle Harbour to be loaded with coal, a distance of 12 miles. A railway connection exists between the private line and the New South Wales Government railways at Hexham, by which coal is also despatched for shipment at Newcastle Harbour.

Section from an earlier portion of workings.



	ft.	in.	
Blue shale, with Glossopteris, Phyllotheca, &c.			
Coal and bands	3	6	
Coal	1	8½	Coal worked.
Band	0	0½	
Coal	1	8	
Band	0	0½	
Coal	1	6	
Band	0	1	
Coal	0	9	
Coarse coal	0	9½	
Total thickness.....	10	1	

The Borehole coal seam worked at the before-mentioned Newcastle collieries is one and the same seam. It is a bright bituminous caking coal of first-class quality for steam, household, coking, and smelting purposes, a good gas coal, and as yet there has been found no equal to it in New South Wales for all these general purposes. At a test of Burwood coal made in September, 1892, on the Victorian railways, it was found that the average water evaporated per lb. of coal consumed was 7·38, the average percentage of ash, including dust retained in the smoke-box, being 11·0. A test for gas purposes made in San Francisco showed the yield per ton of coal carbonised to be 11,200 cubic feet. The analysis of Burwood coal is as follows :—

	Per cent.
Moisture	2·1
Volatile hydrocarbons	32·7
Fixed carbon.....	60·6
Ash.....	4·6
Sulphur, ·38 per cent.	100·0

Mean dip of seam, 1 in 90 south.
Roof of mine composed of shale.
Floor of mine composed of inferior coal with stone bands.
Depth of winding shaft, 591 feet.
Diameter of winding shaft, 15 feet.

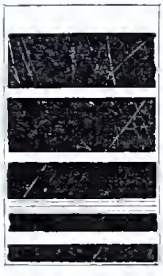
Surface Plant—Winding engines of horizontal coupled type—
Diameter of cylinders, 24 inches.
Length of stroke, 48 inches.
Diameter of winding drum, 10 feet.

Haulage engines of horizontal coupled type—
Diameter of cylinders, 14 inches.
Length of stroke, 30 inches.
Ratio of gearing, 9 to 1.
Diameter of endless rope driving-wheels, 6 feet.
Speed of endless rope, about $1\frac{3}{4}$ miles per hour.

Screening plant—
The full coal skips or tubs are emptied on to the screen bars by means of automatic and balanced side-delivery tipplers.
The screens themselves are 21 feet long x 10 feet wide, and are of the shaking or "jigger" type, motion being given by a horizontal steam-engine having cylinder 12 inches diameter x 18 inches stroke.
The full skips are carried from the cages to the screens by means of a self-acting incline, and the empty skips are carried from the screens back to the cages by means of an endless link belt, driven by the main haulage engines.
The capable output of the colliery is from 800 tons to 1,000 tons per day of e hours.

1004. BURWOOD COAL-MINING COMPANY (Limited), Newcastle.

Three blocks of Coal, showing thickness of seam worked at the Burwood Colliery.



	ft.	in.
Shale.		
Coal	2	6
Band	0	1
Coal	2	2
Band	0	1
Coal	1	2
Chitter (Morgan)	0	6
Coal	0	8
Band	0	1
Coal	0	10
	8	1

Worked by the Burwood Coal-mining Company (Limited), at Little Redhead, about 5 miles from Newcastle, and connected with that port by the Company's railway About 850 acres of land, held by the Company under lease from Mr. E. C. Merewether, were first opened up by the Company in September, 1883. In December of the following year a winding shaft 14 ft. 6 in. in diameter was commenced, and the Borehole seam was passed through at a depth of 266 ft. on the 10th May, 1885. The Company's output has been mainly drawn from these workings, but an adjoining block of 320 acres, held under lease direct from the Crown, has lately been opened out. On this block a new winding shaft 15 ft. in diameter has been sunk, cutting the same seam of coal at a depth of 588 ft. Drives have been taken from one pit to the other; the whole distance, namely, about 2,000 yards, being driven through the seam, which has been proved to be of the same excellent quality throughout the full length of these headings. The equipment of the new shaft has just been completed, the pit-head machinery and other appliances being of the most modern description, as is shown by the details given below. In addition to the above property the Company holds permits to mine under the ocean, having a frontage of 100 chains, but no operations have been commenced in this direction. The Company has a capital of £100,000. The registered offices are at 16, O'Connell-street, Sydney, New South Wales.

Department E.—Mines, Mining, and Metallurgy.

Group XLIII—Class 292: Coal, &c.

1005. GRETA COLLIERIES COMPANY (Limited), Sydney Office: 63, Pitt-street; London Office: 6, Crossley Square, E.C.

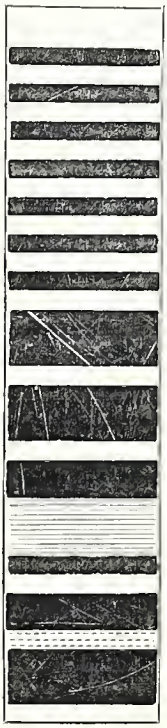
Section of Coal from the Company's Leconfield Colliery, situated 35 miles north-west of Newcastle in New South Wales. The seam is opened by two tunnels. The roof consists of a coarse conglomerate.

A block of Coal from the Company's Greta Colliery, B Pit, situated 32 miles north-west from Newcastle. The present output from this Pit is 700 tons per eight hours' shift.

	ft.	in.
Conglomerate and sandstone, full of fossil fauna, Conularia, Orthoceras, Producta, Spirifera, Inocerami, Crinoidea, &c.		
Coal	1	9
Indurated clay	0	4
Coal	0	10
Indurated clay	0	2
Coal	4	8
Black shale	0	3
Indurated clay	0	4
Coal	3	10
Black shale	0	6
Coal	3	6
Total thickness	16	2
Conglomerate (floor).		

1006. HETTON COAL-MINING COMPANY (Limited), Bond-street, Sydney.

Section of Coal from the Company's Mine, Newcastle.



	ft.	in.	
Coal	0	8	This section is not worked.
Band	0	1	
Coal	0	9	
Band	0	1	
Coal	0	2	
Band	0	1	
Coal	0	3	
Band	0	1	
Coal	0	3	
Band	0	1	
Coal	0	7	
Band	0	1	
Coal	0	5	
Band	0	1	
Coal	3	3	No. 3 block taken from here.
Band	0	0½	
Coal	3	4½	No. 2 block taken from here.
Band	0	0¾	
Coal	1	4	
Morgan	2	5	
Coal (little tops not worked)	0	6	
Band	0	0	
Coal	1	9	
Jerry or refuse	0	7	No. 1 block taken from here.
Coal	3	5	
	20	5¼	

Department E.—Mines, Mining, and Metallurgy.

Group XLIII—Class 292: Coal, &c.

The Borehole coal-seam with a total thickness (including bands) of 22 ft. 2 in., was sunk through by the Hetton Coal Company at Bullock Island, adjacent to the wharf, the steamer cranes fronting the Newcastle Harbour. It was cut at a depth of 237 ft. from the surface by a shaft 15 ft. 10 in. in diameter, lined with cast-iron tubing for a depth of 180 ft. from the surface. The sinking commenced 27th November, 1885, and was completed 19th March, 1887. The coal is of excellent quality, suitable for house fire, steam, gas, blacksmith, and coking purposes. A compound winding-engine, with two 26-in. cylinders and a 54-in. stroke, three boilers 6 ft. in diameter and 34 ft. long, Tangye pumps with an air compresser to work them instead of steam, a substantial head-gear, and three screens, &c., have been erected. (Examiner of Coal-fields' Report, Annual Report, Department of Mines, 1887.)

1007. MINISTER FOR MINES & AGRICULTURE, Sydney.

Collection of Samples of Coal from the Coal Seams of New South Wales.

	Description and Locality.	
1.	Semi-bituminous coal—Homeville Colliery, West Maitland (lower seam).	Carboniferous, Lower Coal Measures (Greta and Stony Creek) Series.
2.	,, ,, ,, (top seam).	
3.	,, ,, ,, (bottom seam).	
4.	Splint coal— ,, ,, (cannel seam).	
5.	,, West Maitland.	
6.	Semi-bituminous coal—Bruuker and Wolf's tunnel, West Maitland.	
7.	,, ,, ,, ,,	
8.	,, —West Maitland.	
9.	,, —Heddon Greta, near West Maitland.	
10.	Cannel coal—Air-shaft, Greta.	
11.	Semi-bituminous coal— ,,	
12.	Bituminous coal—Anvil Creek, near Greta.	
13.	Semi-bituminous coal—Black Creek, Branxton.	
14.	Bright bituminous coal ,, ,,	
15.	,, —Buttai Colliery.	Carboniferous, Middle Coal Measures, Tomago East (Maitland) Series.
16.	,, —Thornley Colliery, East Maitland.	
17.	Semi-bituminous, with bituminous layers—Sutherland Colliery, East Maitland.	
18.	Bright bituminous coal—Singleton Colliery, near Ellsmere.	
19.	,, ,, ,,	
20.	,, —Curlewis.	
21.	,, ,,	
22.	,, —Near Gunnedah.	
23.	,, —Black Jack, near Doughboy Hollow.	
24.	,, ,, ,,	
25.	,, —Ferndale Colliery, Newcastle District.	Permo-Carboniferous Upper Coal Measures (Newcastle) Series.
26.	,, —Waratah Colliery, ,,	
27.	,, —Waratah.	
28.	,, with layers of mother of coal—South Wallsend, Newcastle Colliery.	
29.	Bright bituminous coal, with layers of mother of coal—South Wallsend, Newcastle.	
30.	Bright bituminous coal, with layers of mother of coal—West Wallsend, Newcastle.	
31.	Bright bituminous coal, with layers of mother of coal—No. 1, Wallsend, Newcastle.	
32.	Bright bituminous coal, with layers of mother of coal—Young Wallsend, Newcastle.	
33.	Bright bituminous coal, with nodular structure—Wickham and Bullock Island, Newcastle.	
34.	Bright bituminous coal, with layers of mother of coal—Hetton, Newcastle.	
35.	,, ,, ,,	

Department E.—Mines, Mining, and Metallurgy.

Group XLIII—Class 292: Coal, &c.

Description and Locality.

36. Bright bituminous coal—Stockton Colliery, Newcastle.
37. ,, with semi-bituminous layers—Stockton Colliery, Newcastle.
38. Section of bright bituminous coal (nodule)—Stockton Colliery, Newcastle.
39. Bright bituminous coal ,, ,, ,,
40. ,, with layers of mother of coal—East Lambton Colliery, Newcastle.
41. Bright bituminous coal, with layers of mother of coal—New Lambton Estate, Newcastle.
42. Bright bituminous coal, with layers of mother of coal—New Lambton Colliery, Newcastle.
43. Bright bituminous coal, with layers of mother of coal—Burwood, Colliery, Newcastle.
44. Bright, friable, bituminous coal—West Burwood, Newcastle.
45. Bright bituminous coal, with layers of mother of coal—Brown's Duckenfield Colliery, Minmi.
46. Bright bituminous coal, with layers of mother of coal—A. A. Company's Colliery, Newcastle District.
47. Bright bituminous coal, with layers of mother of coal—Co-operative Colliery, Newcastle District.
48. Bright bituminous coal, with layers of mother of coal—Co-operative Colliery, Newcastle District.
49. Bright bituminous coal, with layers of mother of coal, friable—Newcastle Coal-mining Co.'s Colliery, Newcastle District.
50. Semi-bituminous, with bituminous layers—Lake Macquarie.
51. ,, ,, and mother of coal—Great Northern Colliery, Lake Macquarie.

Permo-Carboniferous Upper Coal Measures (Newcastle) Series.

52. Bright bituminous coal—Southern District.
53. ,, —Metropolitan Colliery, Southern District.
54. ,, ,, ,,
55. ,, ,, ,,
56. ,, ,, ,,

57. Semi-bituminous coal, with bituminous layers—Eskbank Colliery, Lithgow.
58. ,, ,, —Lithgow Colliery, ,,
59. ,, ,, —Vale of Clwydd, ,,
60. ,, ,, —Hermitage Colliery, ,,
61. ,, ,, ,, ,,
62. ,, ,, —Zigzag Colliery, ,,
63. Semi-bituminous coal, with bituminous layers and mother of coal (dirty)—Mount Victoria.
64. Semi-bituminous coal, with bituminous layers and mother of coal (dirty)—Rylstone.

Permo-carboniferous. Upper Coal Measures (Blue Mountains), Western Series.

65. Semi-bituminous coal, with bituminous layers and mother of coal (dirty)—near Mittagong.
66. Bituminous, with semi-bituminous coal and mother of coal—Mittagong Colliery.
67. Bituminous, with semi-bituminous coal and mother of coal—Mittagong Colliery.
68. Bituminous coal, with mother of coal—Mittagong Colliery.

Permo-carboniferous. Upper Coal Measures, Mittagong (South-western), Series.

69. ,, with semi-bituminous layers—Bungawalbyn Mount.
70. ,, ,, ,, (friable).
71.
72.

Mesozoic (Clarence and Richmond) Series.

73. Kerosene shale—near Mittagong.
74. ,, —Joadja Creek.
75. ,, —Doughboy Hollow, near Murrurundi.
76. Graphite—Undercliff, near Wilson's Downfall, New England.

Department E.—Mines, Mining, and Metallurgy.

Group XLIII—Class 292: Coal, &c.

1008. MOUNT KEMBLA COAL-MINING COMPANY, 97, Pitt-street, Sydney.

Section of Coal from Mount Kembla Colliery in the Illawarra Coal-field. Seam, 6 ft. 6 in. thick.

Grey post.

Coal 4 ft. to 6 6

Fireclay.

PROXIMATE ANALYSIS.

Hygroscopic moisture	1·50
Volatile hydrocarbons	19·74
Fixed carbon	67·18
Ash	10·72
Sulphur	·86
	100·00

Specific gravity, 1·363. 1 lb. of this coal will convert 13·21 lb. of water into steam.

Being a section of the coal-seam opened out by Mr. Burall, on the Mount Kembla Coal and Oil Company's property, consisting of 2,100 acres of freehold and leasehold land at Mount Kembla, near Wollongong. It is the upper or No. 1 coal-seam, 4 ft. to 6 ft. 6 in. in thickness of clean coal, free from bands, identical with that worked at the Osborne, Wallsend, and other collieries in the Illawarra District; and is wrought from an adit at a height of about 750 ft. above sea-level. A tramway, 5 miles in length, has been constructed from the mine to Five Island Point, where a jetty has been constructed, and steam colliers, &c., come alongside and take away the coal. The Illawarra Railway, now in course of construction, crosses their tramway at about 4 miles from the adit, and 50 miles from Sydney.

1009. NEWCASTLE COAL-MINING COMPANY, Newcastle.

Section of the Borehole Coal-seam, worked by the Newcastle Coal-mining Company, on 1,400 acres of land leased from E. C. Merewether, Esq., at the Glebe, 2½ miles from the Newcastle Harbour by rail, and found at a depth of 303 feet from the surface.

Coal at present being worked, and from which Exhibit was taken.

	ft.	in.
Roof, dark grey shale (laminated).		
Coal, good and bright	2	8
Brown stone band	0	1
Coal, good and bright	2	6
Brown stone band	0	0½
Coal, good and bright	1	3
Morgan	0	8
Coal, good	0	7½
Brown stone band	0	1
Coal (little tops), good	0	9
Jerry	1	6
Bottom, coal (inferior)	2	0
Floor.		
Total section	12	2

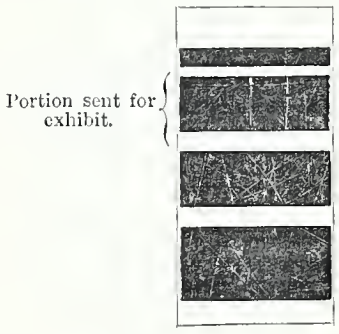
This colliery was opened out and the coal won by the late J. Winship, Esq., who for fifteen years was colliery viewer for the Australian Agricultural Company, and resigned his appointment with them to invest in and open out this colliery. Their haulage, drainage, and ventilation arrangements are all that could be desired. The coal lies very regular, is very free from faults, and dips about 1 in 40 south.

Department E.—Mines, Mining, and Metallurgy.

Group XLIII—Class 292: Coal, &c.

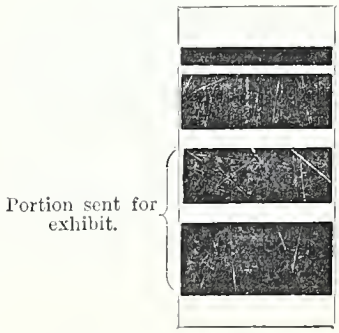
1010. NEWCASTLE WALLSEND COAL COMPANY, South British Chambers, 12, Bridge-street, Sydney.

No. 1 Tunnel.



	ft.	in.	
Coal (left to support shale roof) ..	0	8	
Coal	2	4	Thickness of seam worked, 8 ft. 5 in.
Band	0	1	
Coal	2	1	
Band	0	1	
Coal	3	10	
	9	1	

No. 2 Tunnel.



	ft.	in.	
Coal (left to support shale roof) ..	0	10	
Coal	2	4	Thickness of seam worked, 8 ft. 8 in.
Band	0	1	
Coal	2	2	
Band	0	1	
Coal	4	0	
	9	6	

This seam, 9 feet in thickness, is wrought out for a distance of over 1 mile south of their Dark Creek adits. It is very free from faults, lies very regular, and dips about 1 in 60 south-west and south. The coal is brought to the surface through adits, near the entrance of which there are three stationary engines that draw it in miner's skips of 12 cwt. each, up slight inclines, on to the landing-stage erected alongside the Company's railway, where the Company have appliances for despatching 2,200 tons of round and small coal per day of 8½ hours. They have three furnaces producing in their mine from 200,000 to 205,000 cubic feet of air per minute.

1011. OSBORNE WALLSEND COAL-MINING COMPANY, F. P. MacCabe, Manager, Change Alley, Circular Quay, Sydney.

Section of the Coal-seam worked at the Osborne Wallsend Colliery on 1,352 acres of freehold land belonging to the Osbornes' at Mount Keira, near Wollongong.

Grey post.

	ft.	in.
Coal	7	6

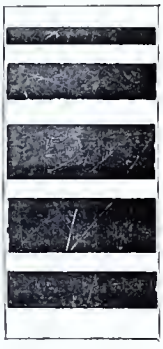
Fireclay.

It averages about 7 ft. 6 in. in thickness of clean coal, free of bands, has an average specific gravity of 1·36, and dips west and north-west about 1 in 30. It is the uppermost

coal-seam in the Illawarra District (*vide* No. 1 Section), and is found outcropping at a height of about 600 feet above sea-level in the high ranges fronting the Wollongong Harbour, where adits, situated 2 miles from the Illawarra Railway, now being constructed, are driven into it, and an incline and locomotive tramway of about 3 miles in length conveys the coal from the mine to the Wollongong Harbour.

1012. SAYWELL, T., 6, Park-street, Sydney.

Block of Coal showing thickness of the portion of Seam worked at the Zig-Zag Colliery.



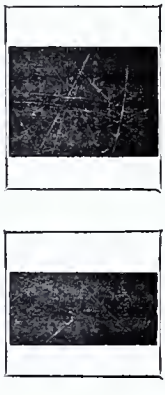
	ft.	in.
Coal	1	0
Band	0	1
Coal	1	5
Coal and bands	0	8
Coal	3	0
Band	0	0¼
Coal	3	0
Band	0	2
Coal (left)	1	6
Grey post floor.	204	0¼

Total thickness of strata from above the shaft to bottom of 11 feet coal.

Being a section of the Great Western Zig-Zag Company's Lithgow Valley coal-seam, opened out in 1883, and now worked on 410 acres of leasehold land by Messrs. Wilson and Saywell, about 1 mile from the Vale of Clwydd Colliery, and 96 miles by rail from Sydney. The coal is similar in quality, dips in the same direction, and is as free from faults as that worked at the other Lithgow collieries beforementioned. Powerful winding and pumping engines and a substantial pit-top have been erected.

1013. SOUTH BULLI COAL-MINING COMPANY, 78, Pitt-street, Sydney.

Section of Coal from South Bulli Colliery, Bellambi.



Roof—grey post.

	ft.	in.
No. 1. Coal	8	0
Sandstone and shale	18	6
No. 2. Coal	4	2

This Company is working the same coal-seam as the Bulli Coal Company, for description of which see entry of latter Company.

1014. WALLARAH COAL COMPANY (Limited), Catherine Hill Bay.

Coal from the 10 ft. 6 in. Coal-seam worked in the Company's Colliery, near the coast, about 48 miles north from Sydney, and 16 miles south from Newcastle.

	ft.	in.
Sandstone.		
Coal	2	0
Stone	0	2
Coal	8	6
	10	8
Conglomerate.		

A jetty 1,020 ft. long has been constructed from the end of the railway by which the coal is conveyed from the mine—a distance of about 2½ miles. The deck of the jetty is 30 ft. above high-water level, and the depth of the water alongside is 25 ft. at low tide, giving ample shipping facilities. The seam now being worked is reached by an adit from a point about the centre of the Company's freehold of 1,200 acres. There are other seams underlying the whole of the property. The following is an analysis of the Wallarah coal by Mr. W. A. Dixon., F.I.C., F.C.S. :—

Carbon	74·26
Hydrogen	5·29
Oxygen	10·98
Nitrogen	0·94
Sulphur	0·45
Moisture	1·30
Ash	6·78
	100·00

It is calculated from this analysis that the calorific intensity of the coal is 6,853 units. The volatile hydro-carbons amount to 24·88 per cent. The ash is fine and buff-coloured, and the coal in burning forms no clinker.

1015. WEST WALLSEND COAL-MINING COMPANY (Limited), 7, Exchange, Sydney.

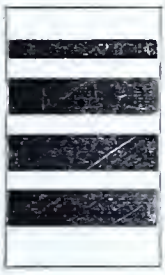
Section of Coal showing thickness of the coal-seam worked at the West Wallsend Colliery, near Newcastle.

The Borehole seam has, with bands, a workable thickness of 5 ft. 4⅞ in., on the West Wallsend Coal Company's property. The winding shaft is 15 ft. in diameter and 492 ft. in depth ; the furnace shaft is 10 ft. in diameter and 492 ft. in depth. The colliery is situated in the parish of Teralba, county of Northumberland, and will be 14 miles from the Newcastle Harbour when their branch line of about 5 miles in length has been constructed to the Government Railway near the Teralba Station. Two coupled 25 in. cylinder winding engines, a conical drum 10 ft. to 12 ft. in diameter, four boilers 5 ft. 6 in. by 33 ft., and an iron head-gear, &c., have been erected, and when the railway line now in course of construction is completed, it is intended to ship coal to Newcastle. The coal is suitable for house, fire, steam, gas, blacksmith, and coking purposes.

Department E.—Mines, Mining, and Metallurgy.

Group XLIII—Class 232: Coal, &c.

The seam worked by the West Wallsend Coal Company is what is locally known as the Wallsend or Borehole seam, and is the same as worked by the majority of the Newcastle coal companies. Its component parts are identical with Minmi or Duckenfield Collieries, and the seam can be traced from Borehole or A.A. Companies' mines through each adjoining colliery to West Wallsend.



	ft.	n.
Coal	0	6
Band....	0	1
Coal	1	10
Band....	0	1
Coal	1	8
Band....	0	1
Coal	1	4

By sketch in margin you will see the different bands and their average thickness from floor to roof, showing a height to roof coal of 5 feet, but this varies a few inches. The roof coal is about 6 inches thick, and is hardly as good in quality as the rest of the seam, and is left in mine for this reason, the rest of the seam only being worked. The inch bands are stone, and are found to vary slightly in the whole of the property. The winding shaft and air shaft are in close proximity, and are 480 feet from surface to floor of seam; the winding shaft is 17 feet in diameter, while the air shaft is 12 feet in diameter. The coal is raised to the surface by means of a pair of winding engines, working on the first motion, cylinders being 22 inches in diameter, with a 4 ft. 6 in. stroke, the winding ropes passing round conical drums varying in diameter from 12 to 14 feet.

The cages hold two skips, each carrying 12 cwt. of coal, thus making the amount of coal lifted every cage 24 cwt., and the engines perform the journey in 24 seconds. The winding shaft is fitted with wire rope guides, and a patent detatching hook to prevent overwinding.

The mine is comparatively dry, but to be ready to meet any great influx of water, a large compound pumping engine is fitted below. The high-pressure cylinder is 16 inches diameter, the low pressure 32 inches diameter, with 4-feet stroke and 8-inch ram, double-acting. To supply the mine with air, there is a Guibal fan erected, 30 feet diameter and 10-feet blades, which, when run at full speed, is capable of exhausting 180,000 cubic feet of air per minute. This fan has duplicate engines, 22-inch cylinders and 4-ft. 6-in. stroke, it being possible, in the event of a break-down, to couple the duplicate in seven minutes.

To insure cleanliness of the coal, a band-screen has lately been erected. It consists of a travelling-band 80 feet long and 4 feet broad, which travels at the rate of between 50 and 60 feet per minute, thus allowing the coal-cleaners every opportunity of detecting and separating impurities in the coal. The coal is first tipped on to a jigging-screen, which is kept in a state of agitation by means of eccentrics, and the small separated from the large coal, the large coal being projected in small quantities on to the travelling-band, where it is cleaned, as described above, and dropped into the waggons. This method of cleaning and filling the coal is much superior to the old style, as it gives the buyer coal which is thoroughly separated from the small, insures a much greater degree of cleanliness, and by means of shoots prevents the great amount of breakage of coal which is necessitated in the old style.

A large coal-box, capable of holding 2,200 tons of small coal, is in use at the mine, and is so arranged that thirty-six waggons can be filled simultaneously. The box is filled by means of a small hopper-waggon, which is filled with small coal at the screens and drawn up an incline into the box by means of a small engine, and empties itself automatically.

Analysis by W. A. Dixon, F.I.C., F.C.S.

Moisture	1·04
Volatile hydro-carbon	36·35
Fixed carbon	56·98
Ash	4·96
Sulphur	·67
	100·00

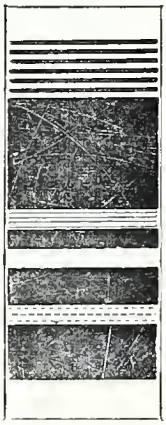
It is a bright bituminous coal, having a specific gravity of 1·28. It gives 61·94 bright coke, much swollen up.

Department E.—Mines, Mining, and Metallurgy.

Group XLIII—Class 292: Coal, &c.

1016. WICKHAM & BULLOCK ISLAND COAL-MINING COMPANY, Exchange, Sydney.

Coal from the Wickham and Bullock Island Colliery, Newcastle.



	ft.	in.
Coal and bands	2	8¾
Coal	9	10
Morgan	1	0
Coal	0	9
Band	0	1
Coal	1	7½
Jerry	0	8½
Bottoms (Coal)	3	8
	20	4¾

About the end of June, 1884, Mr. Hugh Walker, with the assistance of Mr. Fairley, commenced to sink a shaft 10 ft. in diameter, situated alongside the Government Bullock Island Railway, and only half a mile from the Bullock Island wharf and shipping cranes.

Iron cylinders, manufactured by Messrs. Morrison & Bearby, ironfounders at Bullock Island, 10 feet in diameter, in six segments 3 ft. in depth, were sunk by pressure (to hard rock) to a depth of 173 ft., the total depth of the shaft being 231 ft. through the Borehole coal-seam, 18 ft. 6 in. in thickness, which was sunk in the short period of eight months. After the 173 ft. of sand, gravel, and clay had been passed through with the cylinders, the strata between it and the Borehole coal consisted of hard rock. The coal dips slightly south-east, and has a specific gravity of 1·28. A substantial pit-top, with screens, &c., has been erected.

The area is about 2,200 acres held under mineral leases. The output is about 820 tons per day, and the number of men employed is about 500.

MINISTER FOR MINES & AGRICULTURE, Sydney.

1017. Diamond Drill Cores, representing to scale the strata passed through by the Diamond Drill, on the Moorbank Estate, near Liverpool.

Mr. Geological-Surveyor David, who selected the above cores, states that this bore, which is 2,605 ft. deep, is the deepest in the Southern Hemisphere. The bore was commenced by the Australian Diamond Drill Company, and carried to a depth of 1,485 ft., at which depth it was discontinued.

In September, 1889, boring was resumed here, with a powerful diamond drill belonging to the Department of Mines. The bore was reamed to a uniform diameter of 2½ in., and was then carried down successfully for the same diameter to a depth of 2,605 ft., at which depth the bore was completed in April, 1890. The whole work was executed under the superintendence of Mr. W. H. J. Slee, F.G.S., Chief Inspector of Mines, and Superintendent of Drills.

The strata from the surface to a depth of 2,440 ft. belong to the Hawkesbury Series, usually considered to be of Triassic age, and are characterised by the presence of the fossil fern *Thinnfeldia*, and by species of *Estheria*. These strata consist chiefly of whitish-gray sandstones, with bands of fine quartz pebble conglomerate, and chocolate and mottled clay shales with bands of dark grey clay shales, the last usually fossiliferous.

The line of junction between the Triassic Hawkesbury Series and the Permo-Carboniferous Coal Measures is not very apparent, but is probably indicated by the bands of ferruginous sandstone and pebbles of clay ironstone which occur at about 2,440 ft. from the surface.

The first seam of coal was struck at 2,492 ft. 6 in., but proved thin, and after passing through two more thin seams, the drill struck a fine seam of steam coal 6 ft. 6 in. thick,

at a depth of 2,579 ft. 2 in. This seam in all probability is identical with the lower Bulli seam struck at the Holt-Sutherland Bore, 17 miles south of Sydney, at a depth of 2,300 ft., and which is to be seen outcropping at Coal Cliff, on the coast, 33 miles south of Sydney.

The bore is situated about 26 miles south-westerly from Sydney by the present railway, and about 23 miles by the surveyed loop-line from Liverpool to Sydney.

1018. Diamond Drill Cores, representing the strata and principal coal seam passed through between the depths of 2,600 ft. and 3,032 ft., by the Government Diamond Drill, at Cremorne, North Shore, Port Jackson.

The bore from which the core was selected is the deepest yet attempted in the Colony. It was put down under the superintendence of Mr. W. H. J. Slee, F.G.S., Chief Inspector of Mines and Superintendent of Drills, on behalf of the Sydney and Port Hacking Coal Mining Company, (Limited).

The existence of a coal seam, 8 ft. 9½ in. thick (probably identical with the Bulli seam), under the City of Sydney, was proved at a depth of 2,801 ft. 9 in. Unfortunately, 34 ft. 9 in. above the coal seam, a narrow dyke of volcanic rock was struck, the dip of which was almost vertical, the drill penetrating the coal in all probability within a few feet of the intrusion of the dyke; consequently the coal was partly charred by the contact of the heated rock, and to a certain extent saturated by mineral solutions resulting therefrom.

Following is a section and analysis of the coal seam :—

	ft.	in.
Coal, with thin calcite strings	0	2
,, basaltic material (dyke)	0	8½
,, thin calcite strings	5	9*
,, basaltic material	0	4
,, thin calcite strings	0	4
Clayey coal, much contorted and charred	1	6
	8	9½

*Analysis.

Hygroscopic moisture	1·40
Volatile hydrocarbons	5·35
Fixed carbon	59·75
Ash	33·50
	100·00

A second bore is now being put down at a distance from the first site, which, it is believed, will be outside the sphere of influence of the dyke mentioned.

1019. AUSTRALIAN KEROSENE OIL & MINERAL COMPANY (Limited), 5, Gresham-street, Sydney.

Petroleum Oil Cannel Coal (Kerosene Shale), from the Company's mine at Joadja Creek.

Conglomerate (roof).

	ft.	in.
Bituminous coal	0	8
Boghead mineral	1	0
Indurated clay	0	1
Boghead mineral	1	0
Coal and shale, coal-cutter holes in this 9 inches below bottom of Boghead mineral	0	9
Thickness wrought	3	6

18 in. hard blue shale.

Analysis of "Shale."

Volatile hydro-carbons	82·50
Fixed carbon	11·00
Ash	6·50
	100·00

Specific gravity, 1·238.

Petroleum Oil Cannel Coal (Boghead mineral).

Worked by the above Company at Joadja Creek, near Berrima, in the county of Camden, from which place a tramway 18 miles in length conveys the mineral to the Great Southern Railway, a distance of 77 miles from Sydney and the Harbour of Port Jackson. The dip is about 3½° north, 20° west.

A heading has been driven in near the centre of the deposit, and shoots erected for sending down the mineral from the mouth of the heading to a tramway constructed in the valley below. The petroleum oil cannel coal is of excellent quality, lies very flat, is easily and cheaply wrought, and sections of the seam have been laid bare in five other places.

The richest of the mineral gives 15,309 cubic feet of 48-candle gas per ton, and has a specific gravity of 1·098. When retorted for oil and its products it yields over 150 gallons of crude oil to the ton.

The late Mr. C. S. Wilkinson, F.G.S., F.L.S., Government Geologist of New South Wales, in the Annual Report, Department of Mines, 1890, states that—

This petroleum oil cannel coal, from which kerosene oil and other products are manufactured, has hitherto only been found in payable quantity in this district on the property of the Australian Oil and Mineral Company, at Joadja Creek, whence it is connected with the Great Southern Railway at Mittagong by a line of tramway 18 miles in length. Joadja Creek flows down a valley, which has been eroded to a depth of about 500 feet through the Hawkesbury series, the freshwater coal measures, and into the marine carboniferous strata. This once wild valley, walled in as it were by the craggy precipices of the Hawkesbury sandstones, has been transformed into a scene of industrial activity by the extensive works of the Australian Oil and Mineral Company—a picturesque scene of mining enterprise, which strikes the visitor with surprise on reaching the head of the mountainous forest covered plateau, over which he has travelled for several hours from Mittagong. A steeply-inclined tramway descends from the end of the main tramline on to the top of the sandstone escarpment, to the alluvial flats bordering the Joadja Creek, where the refining works, miner's houses, and manager's residence are situated. The seam of kerosene shale crops out on the side of the hill, about half-way down the tramway incline, as well as on the north, on the opposite side of the valley. At the former, where the seam is being worked from an adit, about 300 feet in the adit, south-easterly from the entrance, I measured the following section:—

Conglomerate (Roof).

	ft.	in.
Bright bituminous coal	0	6
"Top" kerosene shale	0	6
Kerosene shale	2	9
"Bottom" shale, hard and splinty	0	6
Bituminous coal	0	3
Fireclay	0	6

The shale in the centre portion of the seam is hewn in large blocks. The occurrence of layers of ordinary bituminous coal associated with kerosene shale is an interesting feature. Small irregular patches of bright jet, and impressions of *Glossopteris* leaves and *Vertebraria* stems occur horizontally in the shale, and there are also numerous stems of *Vertebraria* in a position perpendicular to the plane of stratification. The lustrous black jet substance of these fossil-stems is in striking contrast to the dull colour of the shale enclosing them.

Department E.—Mines, Mining, and Metallurgy.

Group XLIII—Class 292: Coal, &c.

1020. AUSTRALIAN KEROSENE OIL & MINERAL COMPANY (Limited), 5, Gresham-street, Sydney.

Boghead Mineral, from Ruined Castle, Katoomba, yielding in 100 parts—

Hygroscopic moisture	·35
Volatile hydro-carbons	84·02
Fixed carbon	10·10
Ash	5·00
Sulphur	·53
	100·00

Specific gravity, 1·046.

1021. CORBETT, H. P., Eskbank, Lithgow.

Kerosene Shale, from Capertee Valley. Thickness of seam 3 feet 4 inches, with 10 inches of bottom. Analysis of shale, yielding in 100 parts—

Hygroscopic moisture	·53
Volatile hydro-carbons	67·99
Fixed carbon	10·15
Ash	21·33
	100·00

Sulphur, ·631 per cent.
Specific gravity, 1·223.

1022. GENOWLAN SHALE COMPANY (No Liability), 14, Victoria Chambers, Castlereagh-street, Sydney.

Petroleum Oil Cannel Coal (Kerosene Shale), from the Company's property, 6 miles from Capertee, Great Western Railway line.

MINISTER FOR MINES & AGRICULTURE, Sydney.

1023. A Full Section taken from the Petroleum Oil Cannel Coal-seam (Boghead Mineral). Worked by the New South Wales Shale and Oil Company, near Mount Victoria, in the county of Cook.

An incline and tramway about 1 mile in length takes it to the Great Western Railway, at a distance of 81 miles from Sydney and the Port Jackson Harbour. It dips to the east. This is the mine where oil and its products were first manufactured from the New South Wales Boghead mineral in 1865. The works were afterwards removed to Waterloo, Sydney, where the manufacture of oils, paraffine, and other products is still carried on successfully. The richest of the mineral yields over 130 gallons of crude oil per ton when used for oil and its products, and over 18,000 cubic feet of 40-candle gas when gas only is extracted from it. Its specific gravity is 1·052.

1024. Petroleum Oil Cannel Coal from the Australian Kerosene Oil and Mineral Company's Mine, Joadja Creek.

1025. Boghead Mineral from Sugarloaf, Mount Victoria, 77 miles by rail from Sydney, yielding over 17,000 cubic feet of gas per ton, with an illuminating power of about 38 candles, or about 90 gallons of crude oil, per ton.

1026. Boghead Mineral from Bathgate, Marangaroo, 101 miles by rail from Sydney, yielding about 17,000 cubic feet of gas per ton, with an illuminating power of over 36 candles, about 90 gallons of crude oil per ton.

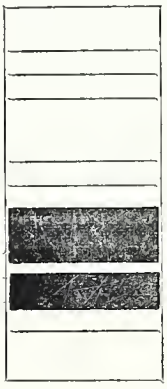
Department E.—Mines, Mining, and Metallurgy.

Group XLIII—Class 292: Coal, &c.

1027. NEW SOUTH WALES SHALE & OIL COMPANY (Limited), W. Hall, Manager, 102 Clarence-street, Sydney.

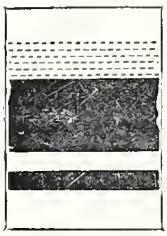
A Full Section taken from the Petroleum Oil Cannel Coal-seam (Boghead mineral). Worked by the abovenamed company at Hartley, near Mount Victoria, in the county of Cook. The seam varies from 1 foot to 5 feet 8 inches in thickness.

Section from previous workings.



	ft.	in.
Blue Rock.		
Blue fireclay	0	6
Indurated clay	0	1
Fireclay	0	3
Black shale	1	3
Indurated clay	0	1
Ironstone	0	3
Boghead mineral	2	6
Boghead mineral	1	3
Indurated clay	0	1
Thickness of boghead mineral seam	6	3

Section of the present workings, measured by the Examiner of Coalfields on the 8th January, 1893:—



	ft.	in.
Fireclay	1	0
Inferior boghead mineral	1	6
Boghead mineral	4	0
Band	0	1
Boghead mineral	0	8
	6	3

An incline and tramway 2 miles in length takes it to the Great Western Railway, at a distance of 81 miles from Sydney and the Harbour of Port Jackson. The dip of the seam is to the east, at an inclination of 1 in 40. It was at this mine that oil from New South Wales Boghead mineral was first extracted in the year 1865, and its production has been continued up to the present with more or less success. From the crude oils thus obtained, kerosene oil, lubricating oils, parafine wax, and many other products are manufactured, utilising in the production of the crude all waste and inferior mineral. The output of this mine for 1892 was 29,419 tons, 20,047 of which were exported to the United Kingdom and Continent of Europe, value of exports being £55,129 5s., the balance 9,372 tons going over to retorts. The better qualities are reserved for gas enriching, and on analysis have been proved to contain 82 per cent. of volatile hydrocarbons, and from practical results, 18,000 cubic of gas per ton of mineral, of 45-candle-power. When used in oil works, 145 gallons of crude oil has been obtained from 1 ton of mineral. Specific gravity of mineral, 1,052. The employees number 214 men and boys.

Group XLIV.—Building Stones, Marbles, Ornamental Stones and Quarry Products.

CLASS 296.—Building Stones, Granites, Slates, etc., rough hewn, sawed or polished—For buildings, bridges, walls, or other constructions, or for interior decoration, or for furniture.

Marble, white, black, or colored.—Stalagmitic marbles, onyx, brecciated marbles, silicified wood, agates, jaspers, porphyries, etc., used in building, decoration, statuary, monuments, vases, or furniture.

Almost every variety of building stone may be obtained in New South Wales. In and around the city of Sydney there are numerous quarries in the sandstone of the Hawkesbury formation. This sandstone, which for colour and texture can hardly be surpassed for building purposes, is the stone most commonly used in the construction of the public and private buildings in Sydney. Extensive deposits of marble, of Silurian and Devonian ages, occur in several places in the Colony. The black variety from the Marulan, and the white from the Cow Flat marble quarries, have been used in flooring the great hall of the Sydney University. The marble near Wallerawang is thus described by Mr. C. S. Wilkinson, L.S., F.G.S., Government Geologist, on his geological survey map of the Wallerawang and Bowenfels district :

> "Thick beds of coraline limestone of very pure quality. It forms a compact marble of various tints—white, cream, and dove-coloured, and sometimes with pink markings. It dresses well, takes an excellent polish, and may be obtained in blocks of almost any required size and quantity. Situated as it is, only 7 miles from the Wallerawang Railway Station, it will be available for the iron-smelting works in the district, and will afford a source of large supply for the Sydney market. The limestone consists almost entirely of corals—*Favosites gothlandica*, *Favosites polymorpha*, *Lithostrotion*, and others, and molluscs as yet undetermined."

The red marbles from the Tamworth district are very handsome when polished, and suitable for ornamental purposes (*vide* samples exhibited).

Granite occurs in great abundance, and in every variety of texture and colour; it is used in Sydney for building and decorative purposes.

Roofing slates of excellent quality have been obtained in the Goulburn, Bathurst, and Gundagai districts.

Fine-grained siliceous sandstone, very suitable for flagging purposes, occurs in the Orange, Burrowa, and Narrandera districts.

Serpentine of pale and dark green colour, sometimes mottled with white, forming a fine ornamental stone, can be obtained in quantity in the Bingera, Grafton, and Young districts. Polished samples are exhibited ; also green felspar porphyry from near Cowra.

Syenite from Mittagong is exhibited ; it was employed in the railway bridge over the Hawkesbury River, as being most suitable for resisting the decaying action of sea-water.

The following particulars have been supplied by Mr. W. M. Lewis, Clerk of Works, East Maitland, concerning the collection of building stones exhibited from the Hunter River district, and are the results of practical experience :—

The Clarence Town sandstone exhibited is very strong and durable ; retains its colour ; withstands the effect of sea air. Blocks upwards of 10 tons each were used in the erection of the buildings near West Maitland for the Hunter River Water Supply ; it was also used in the erection of the Court-house at Dungog, and in the additions to the Post

Office at Newcastle, and I am not aware of a single stone in any of the buildings in which it has been used showing the slightest signs of decay.

The East Maitland stone has the appearance of durability. It was used in the erection of St. Peter's Church at East Maitland.

The Wollombi pink sandstone is a good durable stone, easily wrought, and retains its colour; it was used in the erection of the Public School and masters's dwelling at Wollombi.

The light brown sandstone from the same place is of similar quality to the pink, and as durable; used in the masonry of the Court-house, and would, if it could be conveyed by rail to Newcastle, Maitland, Singleton, &c., do away with the delay which contractors and others are now put to in having to wait time after time for a supply from Sydney, which is usually conveyed by water in sailing vessels.

Some of the Morpeth stone is very durable, but care must be taken to reject any of a blue or gray tint, which, on exposure, turns green, and peels off in flakes; it was used some thirty years ago in the construction of bonded stores at that place, and shows no signs of decay.

The Ravensfield stone is used in the erection of buildings in the Maitland district; it is good stone for ornamental work if kept dry and well above the ground, and care taken to avoid all yellow tints or streaks in the stone, which, if exposed to a north or westerly aspect, will decay.

The Paterson stone is similar to Ravensfield stone; colour, gray and light brown, the latter preferred; it also requires care in selecting; used upwards of twenty years ago in the balustrades and other ornamental works at the Court-house, Paterson, and within the last few years in other public buildings at that place.

Of Muswellbrook stone, some very durable specimens can be seen in the Court-house, Post and Telegraph Office, and Commercial Bank at that place; also in upper part of base course at Court-house, Scone. That obtained from the Grass-tree Quarry, and spotted with bran-like marks throughout, I have always found very durable.

Some of the Greta stone is very durable, but requires great care in selecting; good specimens are to be seen in the Court-house and lock-up at Branxton, near Greta.

The Rutherford stone is similar to Ravensfield, but of lighter colour, and requires care in selecting.

1028. BISHOP, L., Muree, Raymond Terrace.

Freestone, from Moree Quarry.

1029. BROWNE, T., Ravensfield, near West Maitland.

Sandstone, from Ravensfield Quarry.

1030. BURNS, J., Bathurst.

Black and White Coralline Marble Monument, made from Briar Park Marble Limestone, near Rockley.

1031. COMMISSIONERS FOR NEW SOUTH WALES, Sydney.

Marble Slabs from Marulan.
" " Moonbi, near Tamworth.
" " Sala's Quarry, Mullion Creek, near Orange.

1032. CULLEN BULLEN LIME & CEMENT COMPANY, Limited, 347-353, Sussex-street, Sydney.

Cement: Cement Clinker, Dried Slurry, Limestone, Shale, Cement Castings, &c.

1033. DONNELLY, D. C. J., M.P., Cowra.

Diabase Porphyry (Verde antique), Cowra; Serpentine, between Young and Grenfell.

Department E.—Mines, Mining, and Metallurgy.

Group XLIV—Class 296: Building Stones, &c.

1034. LEWIS, Mortimer W., Architect, East Maitland.
Collection of Building Stones (dressed), from the following localities:—

Clarence Town, William's River, very durable.
Wollombi, white, durable.
,, red, ,,
Maitland East, new quarry, ,,
Brook's Flat, near ,, ,,
Rutherford / Ravensfield } near West Maitland, ,,
Cessnock, quarry not open, durable.
Greta, ,,
Muswellbrook, ,,
Narrabri, ,,
Morpeth, ,,
Raymond Terrace, ,,
Paterson, ,,
Gresford, quarry not open, ,,
Dungog, hard to work.
Waratah, ,,
Lambton, ,,
Lake Macquarie, durable.
Lane Cove, ,,
Gosford, ,,

1035. Collection of Marbles, Limestone, &c. (dressed), from the following localities:—

Wallabadah, marble, grey, polished.
Tamworth, ,, red, ,,
,, limestone, grey, ,,
,, ,, ,, rough state.
,, lime from, ,, ,,
Dungog, limestone, ,, ,,
N.S.W. marble, ,, polished.
,, ,, ,, ,,
,, ,, red, ,,
,, Cullen Bullen Cement, used in new Court-house, Newcastle.

1036. MINISTER FOR MINES & AGRICULTURE, Sydney.
Collection of Marbles, Serpentine, &c.

No.	Description.	Locality.
1	Marble (mottled)	Marulan.
2	,, ,,	,,
3	,, ,,	,,
4	,, (yellow)	,,
5	,, ,,	,,
6	,, (red brown)	,,
7	,, ,,	,,
8	,, ,,	,,
9	,, (yellow)	,,
10	,, (red mottled coral)	,,
11	,, (black coral)	,,
12	,, ,,	,,
13	,, ,,	,,
14	,, (white)	,,
15	,, ,,	Cow Flat, near George's Plains.
16	,, ,,	,, ,, ,,
17	,, ,,	,, ,, ,,
18	,, ,,	,, ,, ,,
19	,, ,,	,, ,, ,,

Department E.—Mines, Mining, and Metallurgy.

Group XLIV—Class 296: Building Stones, &c.

MINISTER FOR MINES—Collection of Marbles, &c.—*continued.*

No.	Description.	Locality.
20	Marble (white)	Cow Flat, near George's Plains
21	„ (mottled)	Upper Murray.
22	„ (black coral)	Upper Murray.
23	„ „	„
24	„ (reddish brown)	„
25	„ (white)	„
26	„ (grey)	„
27	„ „	„
28	„ „	Maeleay River.
29	„ (red encrinital)	Moonbi, near Tamworth.
30	„ „	
30A	„ (black enerinital)	Briar Park, near Rockley.
31	Two marble candlesticks	Made from Moonbi Marble.
32	Serpentine	Bingara.
33	„	„
34	„	„
35	„	„
36	„	„
37	„	„
38	„	„
39	„	„
40	„	„
41	„	„
42	Two Vases of Serpentine	Made from Bingara Serpentine.
43	Diabase Porphyry	Cowra.
44	Table Inlaid with Different Varieties of Marble from Marulan, Cow Flat, Moonbi, Kempsey, and other Localities, and Serpentine from Bingara.	

1037. MINISTER FOR MINES & AGRICULTURE, Sydney.

Collection of 6 in. Cubes of Sydney (Hawkesbury) Sandstone.

No.	Description.	Locality.
1	Sandstone	Top, Saunders' Quarry, Pyrmont.
2	„	Middle, „ „ „
3	„	Bottom, „ „ „
4	„	Top, Saunders' Hell-hole Quarry, Pyrmont.
5	„	Bottom, „ „ „ „
6	„	Top, „ „ „ „
7	„	Bottom, „ „ „ „
8, 9	„	Top, Saunders' Purgatory Quarry, Pyrmont.
10, 11	„	Bottom, „ „ „ „
12	„	Top, Messrs. Loveridge and Hudson's Grafton Wharf Quarry.
13	„	Bottom, „ „ „ „ „
14	„	Top, Brown's Rushcutters' Bay Quarry.
15	„	Bottom, „ „ „ „
16	„	Balman's Quarry, Drummoyne Park, Parramatta River
17	„	Top, H. Bell's Quarry, Glenmore Road, Paddington.
18	„	Middle, „ „ „ „
19, 20	„	Bottom, „ „ „ „
21	„	Top, J. R. Watkins' Pembroke Quarry, Waverley.
22	„	Bottom, „ „ „ „
23	„	Top, Harnett's Quarry, Mossman's Bay.
24	„	Bottom, „ „ „
25	„	G. O'Neill's Bishop's Court Quarry, Randwiek.

Department E.—Mines, Mining, and Metallurgy.

Group XLIV—Class 296: Building Stones, &c.

1038. MINISTER FOR MINES & AGRICULTURE, Sydney.

Collection of 1-ft. Cubes of Building Stone, New South Wales.

No.	Description.	Locality.
1 (P.P.)	Sandstone	From R. Saunders' Purgatory Quarry, Pyrmont.
2 (P.P.)	,, ...	,, ,, ,, ,,
3 (P.P.)	,, ...	,, ,, ,, ,,
4 (P.H.)	,, ...	,, ,, Hell-hole Quarry, ,,
5 (P.H.)	,, ...	,, ,, ,, ,,
6 (P.H.)	,, ...	,, ,, ,, ,,
7 (C.P.)	,, (white) ...	,, Moxham Bros., Cumberland Quarry, Parramatta.
8 (C.P.)	,, ,, ...	,, ,, ,, ,,
9 (C.P.)	,, (brown) ...	,, ,, ,, ,,
10 (C.P.)	,, ,, ...	,, ,, ,, ,,
11 (T.R.)	,, (white) ...	,, John Try's Quarry, Randwick.
12 (T.R.)	,, ,, ...	,, ,, ,, ,,
13 (T.R.)	,, (brown) ...	,, ,, ,, ,,
14 (T.R.)	,, ,, ...	,, ,, ,, ,,
15 (N.S.)	,, ,, ...	,, Eaton's Quarry, North Shore.
16 (N.S.)	,, ,, ...	,, ,, ,, ,,
17 (N.S.)	,, ,, ...	,, ,, ,, ,,
18 (N.S.)	,, ,, ...	,, ,, ,, ,,
19 (M.B.)	,, (white) ...	,, T. D. Flew's Quarry, Mossman's Bay.
20 (M.B.)	,, ,, ...	,, ,, ,, ,,
21 (M.B.)	,, (brown) ...	,, ,, ,, ,,
22 (M.B.)	,, ,, ...	,, ,, ,, ,,
23 (H.H.)	,, (white) ...	,, Peaty Quarry, Hunter's Hill.
24 (H.H.)	,, ,, ...	,, ,, ,, ,,
25 (M.)	,, ...	,, Morpeth.
26 (M.)	,, ...	,, ,,
27 (P.)	,, ...	,, Paterson.
28 (P.)	,, ...	,, ,,
29 (R.)	,, ...	,, Rutherford.
30 (R.)	,, ...	,, ,,
31 (R.)	Building Stone.....	,, Ravensfield.
32 (R.)	,, ...	,, ,,
33 (R.)	,, ...	,, ,,
34 (C.T.)	,, ...	,, Clarence Town.
35 (C.T.)	,, ...	,, ,,
36 (C.T.)	,, ...	,, ,,
37 (M.)	,, ...	,, Muswellbrook.
38 (M.)	,, ...	,, ,,
39 (E.M.)	,, ...	,, East Maitland.
40 (E.M.)	,, ...	,, ,,
41 (L.)	,, ...	,, Lambton.
42 (L.)	,, ...	,, ,,
43 (P.P.)	,, (base)	,, R. Saunders' Purgatory Quarry, Pyrmont.
44 (P.P.)	,, (cap)	,, ,, ,, ,,
45 (P.P.)	,, (shaft)	,, ,, ,, ,,

1039. PRITCHARD, W., Picton.

Freestone.

1040. SAUNDERS, R., Amy-street, Pyrmont, Sydney.

Dressed samples of freestone from Pyrmont Quarries; Syenite, Bowral Quarries; Granite, from Moruya; Photographs of Pyrmont Quarries.

Group XLV.—Grinding, Abrading, and Polishing Substances.

CLASS 297.—Grindstones, Hones, Whetstones, Grinding and Polishing Materials, Sand, Quartz, Garnet, Crude, Topaz, Diamond, Corundum, Emery in the rock and pulverized, and in assorted sizes and grades.

1041. BRECKENRIDGE, James, Wyrallah.

Tripolyte from near Lismore.

Analysis.

Moisture at 100 C.	5·36
Combined water	5·96
Silica	86·01
Alumina and oxide of iron	2·83
Lime	Trace
Magnesia	,,
Organic matter	,,
	100·16

1042. KENNEDY & BATEMAN, Tenterfield.

Abrasive and polishing material, prepared and in the rough.

Alumina grit	No. 0, extra fine.
,,	No. 1, fine.
,,	No. 2, medium.
,,	In soap tablets.
,,	Without soap.
Abrasive rock	In the rough.

1043. MUDGEE PIONEER SHEARSTONE, OIL, & WHETSTONE COMPANY.—12, Post Office Chambers, Pitt-street, Sydney.

Oilstones, prepared, and in the rough, from the Company's property, 6 miles from Mudgee.

Group XLVI.—Graphite and its Products, Clays, Asbestos, &c.

CLASS 298.—Crude Graphite.

1044. **MINISTER FOR MINES & AGRICULTURE**, Sydney.
Crude Graphite from Undercliff, New England.

CLASS 304.—Clays, Kaolin, &c.

1045. **SMITH, C. W., Rocky Point Road, Carroll's Hill, Kogarah.**
Plastic clay from Exhibitor's Property at Kogarah.

CLASS 307.—Asbestos.

1046. **MINISTER FOR MINES & AGRICULTURE**, Sydney.
Asbestos, from Jones' Creek, near Gundagai.
„ from near Broken Hill.

Group XLVII.—Limestone, Cements, and Artificial Stone.

CLASS 309.—Lime, Cement, and Hydraulic Cement, raw and burned, accompanied by specimens of the crude rock or material used; also Artificial Stone, Concrete, Beton.

Specimens of Lime Mortar and Mixtures, with illustrations of the processes of mixing, &c. Hydraulic and other Cements.

1047. **CULLEN BULLEN LIME & CEMENT COMPANY** (Limited), 347 to 353, Sussex-street, Sydney.
Hydraulic cement, "Kangaroo" brand, manufactured from material found on the Company's Property, Portland, Great Western Railway Line, New South Wales.
Cement castings, prepared from "Kangaroo" cement by Messrs. Wetherspoon and Harvey, George-street, Redfern.
Shale, limestone, cement clinkers, &c., in different stages of preparation for manufacture of "Kangaroo" cement."

CLASS 311.—Artificial Stone for building purposes, building blocks, cornices, &c.

Artificial Stone Mixtures for pavements, walls, or ceilings.

1048. O'NEILL, Charles, M. Inst. C.E., 200, Cumberland-street, Sydney.

O'Neill's Patent Caithness Artificial Flagging.

CLASS 312.—Asphaltic Mastics and Mixtures, Asphaltic Sand, Asphaltic Limestone.

1049. PATENT ASPHALTUM COMPANY OF NEW SOUTH WALES (Limited), 244, Pitt-street, Sydney.

1. Asphalt Blocks and Tiles for roadways and footpaths.
2. Street Asphalt.

Group XLVIII.—Salts, Sulphur, Fertilizers, Pigments, Mineral Waters, and Miscellaneous Useful Minerals and Compounds.

CLASS 316.—Sulphates, Alums, and other Salts.

1050. AUSTRALIAN ALUM COMPANY (Limited), 12, O'Connell-street, Sydney.

Alunite from the Company's Property at Bulladelah.

The alunite occurs as a large deposit forming the summit of a ridge about ¾-mile long by ½-mile wide, and rising about 1,000 feet above the level of Myall Creek, on which it is situated. Viewed from the Creek it presents a massive outcrop resembling limestone. It yields from 60 to 80 per cent. of alum upon roasting, lixiviating, and evaporating. Myall Creek is navigable for vessels drawing 5 ft. 6 in., and it is shortly to be deepened by dredging. The Company have erected extensive works for preparing the alum.

CLASS 319.—Pigments, Iron Oxides, Ochres, Vermilion, &c.

1051. CLABBY, John, Belgravia.

Paint ochres from Caleula, near Orange.

1052. GORDON EMERY & COLOUR COMPANY, Post Office Chambers, Pitt-street, Sydney.

Paint ochres from the Company's Property, near Orange.

Group LXVII.—History and Literature of Mining and Metallurgy.

CLASSES 410 & 411.—Maps, relief-models and pictures to illustrate the geology and distribution of minerals and mines and the methods of working mines.

History and statistics of mines and mining districts.

Charts, diagrams and tabular representations. Statistics of mineral production.

1053. MINISTER FOR MINES & AGRICULTURE, Sydney.

Geological Maps and Publications exhibited by the Department of Mines and Agriculture, Sydney.

(1.) MAPS.

Map showing Mineral Areas of New South Wales. Scale, 50 miles to 1 inch.
Geological Sketch Map of New South Wales, compiled from the Maps of the late Rev. W. B. Clarke, M.A., F.R.S., by C. S. Wilkinson, L.S., F.G.S., Government Geological Surveyor-in-Charge. Scale, 8 miles to 1 inch.
Do do do do Scale, 22 miles to 1 inch.
Geological Map of the Districts of Hartley, Bowenfells, Wallerawang, and Rydal, by C. S. Wilkinson, L.S., F.G.S.
Geological Map of Hill End and Tambaroora, by E. F. Pittman, Geological Surveyor.
Geological Map of the Vegetable Creek Tin-mining District, by T. W. E. David, B.A., F.G.S., Geological Surveyor. Scale, 58 chains to 1 inch.
Index Map of the Vegetable Creek Tin-fields, by T. W. E. David, B.A., F.G.S. Scale, 80 chains to 1 inch.
Geological Map of the Forest Reefs District, by H. Y. L. Brown, Geological Surveyor.
Vertical Sections of New South Wales Upper Coal Measures, by John Mackenzie, F.G.S., Examiner of Coal-fields,
Diagrams showing the Thickness, Character, and Portion mined out of Coal-seams in the Coal Measures of New South Wales, by John Mackenzie, F.G.S., Examiner of Coal-fields.
Plans showing the Outcrop, Thickness, and Dip of the Coal-seams in the Northern, Southern, and Western Coal-mining Districts of New South Wales, by John Mackenzie, F.G.S., Examiner of Coal-fields.
Geological Sketch Map showing boundary of the Cretaceo-Tertiary Formation in the County of Cowper, by William Anderson, Geological Surveyor, 1889.
Geological Sketch Map of Tertiary Deep Lead, Tumberumba, by William Anderson, 1890.
Plan of Bingera Diamond-fields.
Plan of Abercrombie Gold-field.
Plan of Parish of Annandale, County of Clive.
Plan of Parish of Herbert, County of Gough.
Map of part of the Gulgong Gold-field, County of Phillip.
Plan of Cope's Creek, County of Hardinge.
Plan of Parish of West Fairfield, County Drake.
Plan of Parish of Clive, County of Gough.
Plan of Parish of Scone, County of Gough.
Plan of Parish of Castleton (Sunny Corner), County of Roxburgh.

Department E.—Mines, Mining, and Metallurgy.

Group LXVII—Classes 410 and 411: Mineral Maps, Statistics, &c.

Plan of Gold and Mineral Leases, Upper Bingera, County of Murchison.
Plan of Peel River Gold-field, Parish of Nundle, County of Parry.
Plans of Parishes of Boyd, Bloxsome, Bald Nob, and Mitchell (Peel and Uralla Mining District).
Plan of Broken Hill Silver Mines, New South Wales.
Plan of Mitchell's Creek Freehold Gold Estate, Wellington, New South Wales.
Plan of North-west Part of County Buller.

(2.) PUBLICATIONS.

The Mining Act of 1884, with Regulations.
Annual Reports from 1875 to 1887, inclusive.
Mines and Mineral Statistics, 1875. (Out of print.)

Mineral Products of New South Wales, 1882, containing:—

1. Mineral Products of New South Wales, by Harrie Wood, J.P., Under Secretary for Mines.
2. Notes on the Geology of New South Wales, by C. S. Wilkinson, L.S., F.G.S., Geological Surveyor-in-Charge.
3. Description of the Minerals of New South Wales, by Archibald Liversidge, M.A., F.R.S., F.C.S., F.G.S., &c., Professor of Chemistry and Mineralogy in the University of Sydney.
4. Catalogue of Works, Papers, Reports, and Maps on the Geology, Palæontology, Mineralogy, &c., &c., of the Australian Continent and Tasmania, by Robert Etheridge, Junr., of the British Museum, and Robert Logan Jack, F.R.G.S., F.G.S., Government Geologist for Queensland.

Mineral Products of New South Wales, 2nd Edition, 1886, containing (out of print):—

1. Mineral Products of New South Wales, by Harrie Wood, J.P., Under Secretary for Mines.
2. Notes on the Geology of New South Wales, by C. S. Wilkinson, L.S., F.G.S., Geological Surveyor-in-Charge.
3. The Collieries and Boghead Mineral Mines of New South Wales, by John Mackenzie, F.G.S., Examiner of Coal Fields.

Memoirs of the Geological Survey of New South Wales.

Geology.

1. Report on the Vegetable Creek Tin Mining District, by T. W. E. David, B.A., F.G.S., Geological Surveyor.

Palæontology.

1. The Invertebrate Fauna of the Hawkesbury-Wianamatta Series of New South Wales, by Robert Etheridge, Junr., Palæontologist to the Geological Survey of New South Wales, and Australian Museum, Sydney. (4to. Sydney, 1888.)
2. Contributions to the Tertiary Flora of Australia, by Dr. Constantin, Baron von Ettingshausen, Professor of Botany, University of Graz, Austria. (4to. Sydney, 1888.)
3. Geological and Palæontological Relations of the Coal and Plant-bearing Beds of Palæozoic and Mesozoic Age in Eastern Australia and Tasmania, by Ottokar Feistmantel, M.D. (4to. Sydney, 1890.)
4. The Fossil Fishes of the Hawkesbury Series at Gosford, by A. S. Woodward, &c. (4to. Sydney, 1890.)
5. A Monograph of the Carboniferous and Permo-carboniferous Invertebrata of New South Wales, Part I, Cœlenterata; Part II, Crinoidea, Annelida, and Crustacea; by R. Etheridge, Junr. (4to. Sydney, 1891-92.)
7. The Mesozoic and Tertiary Insects of New South Wales, by R. Etheridge, Junr., &c., and A. Sidney Olliff, &c. (4to. Sydney, 1890.)
8. Contributions to a Catalogue of Works, Reports, and Papers on the Anthropology, Ethnology, and Geological History of the Australian Aborigines, Part I; by R. Etheridge, Junr. (4to. Sydney, 1890.

Records of the Geological Survey of New South Wales.

Vols. I and II; Vol. III, Pt. 1. (Sydney, 1889-92.) (Vol. I, Pt. 2, out of print.)

Department E.—Mines, Mining, and Metallurgy.

Group LXVII.—Classes 410 and 411: Mineral Maps, Statistics, &c.

LIVERSIDGE, Archibald, M.A., F.R.S., Professor of Chemistry in the University of Sydney.

1054. Diagrams, Illustrations, &c., in frames.

1. The Bingera meteorite, in 3 positions, and in section to show internal crystalline structure, and notes on its chemical composition, &c.
3. Photo-lithographs of the Deniliquin meteorite.
4. Photographs (4) of the meteorite from Thunda, Windorah, Queensland.
5. Sketch of specimen of contorted shale, Peelwood Mine, N.S.W., two-thirds of natural size.
6. Figures of moss silver, obtained by roasting silver sulphide at a low temperature.
7. Moss gold (two drawings), obtained by roasting auriferous mispickel, from Lucknow, at a low temperature.
18. Plans of Chemical Laboratories, recently built for the University of Sydney.
19. Photographs of the exterior and interior of the same.

1055. List of Scientific Papers by :

Reports, &c.

1. Reports upon the Disease in the Sugar Cane, Queensland, 1876, 34 8vo. pp., Sydney. "The Sugar Cane," vol. 8, Manchester, England, 1876; *The Queenslander*, 1876; *Moniteur de la Nouvelle-Caledonie, Journal Officiel*, October, 1876.
2. Tables for Chemical Analysis, Sydney, the Government Printer, 1881, 24 pp., royal 8vo.

Papers in Scientific Journals, &c.

3. Dendritic Spots on Paper. Journal of the Chemical Society of London, x., 1872, pp. 646, 647.
4. The Deniliquin or Barratta Meteorite, N.S.W. Trans. Royal Society of N.S.W., vi. 1872, pp. 97, 103.
5. New Nickel Minerals from New Caledonia. Journal Chemical Society, London, 1874, pp. 613–615.
6. Iron Ores and Coal Deposits at Wallerawang in N.S.W. Trans. Royal Society of N.S.W., 1874, pp. 81–91.
7. Examples of Pseudo-Crystallisation. Trans. Royal Society of N.S.W., 1875, pp. 152, 153.
8. The Bingera Diamond-field. Journal Geological Society of London, 1875, pp. 480–492.
9. A remarkable instance of Contorted Slate. Trans. Royal Society of N.S.W., x., 1876, pp. 241–2. (Two plates.)
10. On the occurrence of Chalk in the New Britain Group of Islands. Trans. Royal Society of N.S.W., xi., 1877, pp. 85–91.
11. On the Hot Springs of New Zealand. Trans. Royal Society of N.S.W., xi., 1877, pp. 62–264.
12. The International Congress of Geologists at Paris, 1878. Journal Royal Society of N.S.W., 1879, pp. 35–42.
13. On the Composition of the Moa Egg-shell. Geological Magazine, London, 1880, pp. 546–548. And Trans. New Zealand Institute, 1880, pp. 225–227.
14. On New Zealand Minerals (analyses and description of). Trans. New Zealand Institute, 1877, pp. 490–505.
15. Analyses of a Rock Specimen from New Zealand, showing the junction between Granite and Slate. *Ibid*, pp., 505–506.
16. On the Composition of some Wood enclosed in Basalt. Journal Royal Society of N.S.W., xiv., 1880, pp. 155–157.
17. On the Composition of Cast Iron acted upon by Sea water. *Ibid.*, pp. 149–154; *Chemical News*, 1881.
18. On the Composition of some Coral Limestone. *Ibid.*, pp. 159–162.
19. On the Composition of some N.S.W. Coals. *Ibid.*, pp. 181–212.
20. On some N.S.W. Minerals. Note No. 2. *Ibid.*, pp. 213–225.
21. On Piturie—a plant chewed by the Australian Blacks. *Ibid.*, pp, 123–132; *Chemical News*, 1881.

22. Stilbite (analysis of), from Kerguelen's Land, collected by the "Challenger" Expedition. Proceedings of the Royal Society of Edinburgh, 1881, pp. 117–119.
23. Analysis of Queensland Sugar Plantation Soils. Journal Chemical Society, London, March, 1881.
24. On the Composition and Microscopic Structure of some Igneous Rocks from New Britian. Read before the Royal Society of N.S.W., Dec., 1880.
25. On the Composition and Microscopic Structure of certain N.S.W. Rocks. *Ibid.*
26. On the Bingera Meteorite, N.S.W. *Ibid.*
27. On the Barratta Meteorite, N.S.W. *Ibid.*
28. A peculiar Copper Ore, from Coombing Copper Mine, Carcoar, N.S.W. Journal Mineralogical Society of Great Britain and Ireland, January, 1881.
29. On some N.S.W. Minerals. Note No. 3. Journal Royal Society of N.S.W., XVIII, 1884, pp. 43–48. Plate 1 and 2.
30. On some N.S.W. Silver and other Minerals. Note No. 4. Journal Royal Society of N.S.W., XX, 1886; pp. 231–233.
31. Metallic Meteorite, Thunda, Queensland. *Ibid.*, p. 73.
32. On the Composition of some Pumice and Lava from the Pacific. *Ibid.*, pp. 235–239.
33. On some Rocks and Minerals from New Guinea, &c. *Ibid.*, pp. 227–230.
34. President's Address to the Royal Society of N.S.W., May 5th, 1886.
35. On some N.S.W. Minerals. Note No. 5. Journal Royal Society of N.S.W., XXII, 1888, pp. 362–366.
36. The proposed Chemical Laboratory at the University of Sydney. Proceedings Australasian Association for the Advancement of Science, Sydney, 1888, pp. 168–182.
37. Map of the Minerals of N.S.W. London: Edward Stanford, 1888.
38. Australian Meteorites. Proceedings Australasian Association for the Advancement of Science, Melbourne, 1890; pp. 387–8.
39. Notes on some Hot Spring Waters, New Guinea and Solomon Islands. *Ibid.*, pp. 388–394.
40. On the Removal of Gold from suspension and solution by Fungoid growths. *Ibid.*, pp. 399–407.
41. On Chalk and Flints from the Solomon Islands. *Ibid.*, pp. 417–420.
42. President's Address to the Royal Society of N.S.W., May 7th, 1890. Jour., Royal Society of N S.W., 1890.
43. On some N.S.W. and other Minerals. Note No. 6. Journal Royal Society of N.S.W., XXV, 1891, pp. 234–241.
44. On the Presence of Magnetite in certain minerals and rocks. Australasian Association for the Advancement of Science. Volume 4, 1891–92.
45. On Iron Rust possessing Magnetic Properties. *Ibid.*
46. Notes on some Bismuth Minerals, Molybdenite, and Enhydros. Records of Australian Museum, Vol. 2, 1892. pp, 6. Plates viii, ix, x.

1056. LIVERSIDGE, Archibald, M.A., F.R.S., Professor of Chemistry in the University of Sydney.

Models to show the Axes of Crystals.

These two Models show the relationship of the axes in the tetragonal, rhombic, oblique, and doubly oblique systems of Crystals.

The edges of the crystals are represented by elastic cords, so as to permit of the extension of the axes.

Model No. 1 shows the relationship of the axes in the tetragonal, rhombic, oblique, and doubly oblique systems.

(*a*) By extending the vertical axis acute tetragonal pyramids are obtained.

(*b*) By extending one or more of the axes the rhombic system is shown.

(*c*) The oblique or monoclinic system is obtained by inclining one axis.

(*d*) The doubly oblique or anorthic system is shown by inclining two axes.

All three of the axes can be extended to represent various pyramids; the different forms of brachy and macro-pyramids are shown by extending the lateral axes.

Model No. 2 shows how the domes and horizontal prisms are produced from the pyramids by extending the axes to infinity.

The accompanying photographs show the axes in various positions.

Combination Laboratory Lamp, Retort, and Filter Stand.

The Lamp is fitted with:

1. Bunsen burner with copper shade to support crucibles, evaporating dishes, &c.
2. Regulator Argand burner for evaporating and illumination.
3. Blow-pipe jet.
4. Fish-tail jet for glass bending and illumination.
5. Rose burner.
6. Three adjustable rings.
7. Clamp.

All the parts are readily changed; ground joints are used instead of screw joints, as the latter are apt to become corroded and fixed.

To prevent the burners going astray when not in use, they are placed on pegs attached to the base of the lamp.

The stand is made of lead instead of iron, for the sake of increased stability and to prevent rusting.

1057. COMMISSIONERS FOR NEW SOUTH WALES, Sydney.

Photographic illustrations of Silver Mines at Broken Hill and neighbourhood. Prepared to the order of the Commissioners by Charles Potter, Government Printer.

No. 1. View of the Broken Hill South Silver Mine, looking south, showing main shaft and part of the Town of South Broken Hill.
2. Block 14 Silver Mine, showing smelting and concentrating plants.
3. Broken Hill Proprietary Mine, looking north, showing the viaduct and the amalgamating plants on east side of the hill.
4. View of Broken Hill Proprietary Mine, taken from the town, showing south-west of furnaces and the viaduct.
5. View of the Broken Hill Junction S. M. G. Co.'s Mine, showing No. 7 shaft of the British Broken Hill Mine.
6. Pure silver, value £500, taken from the Australian Broken Hill Consol's Mine, near Broken Hill, during May, 1892.
7. Turtle Slug—weight, 16 cwt.; value, £3,520. This slug of pure silver was mined from the Australian Broken Hill Silver Mine, about 1 mile east of the Proprietary Mine, in May, 1890.
8. View of the British Broken Hill Mine, Broken Hill, taken from the east side of hill, showing the smelting and concentrating plants.
9. View of British Block 14, and Proprietary Mines, from the east side of hill.
10. Broken Hill South Mine, showing smelting plant and bullion.
11. Broken Hill Proprietary Mine, showing the old smelters—taken 1887.
12. The Central Broken Hill Silver Mine smelters.

13. View of Broken Hill Proprietary Mine, showing south-west of smelters, and railway leading to Block 14 Mine.
14. View of Proprietary Block 14, and British Mines; also, the southern part of the Town of Broken Hill.
15. View of Broken Hill Proprietary Mine, lease No. 13, showing the northern nest of furnaces and Rasp's Shaft. Taken 1889.
16. M'Gregor's Shaft, Block 11 Proprietary Mine, Broken Hill, showing the square set timbering at a depth of 300 ft.
17. View of Block 11 Proprietary Mine, and the Central Silver Mine, looking south.
18. General view of Broken Hill Proprietary Mine, from west side of hill.
19. Broken Hill Proprietary Mine, looking north, showing the viaduct and sawmills.
20. View of Broken Hill Proprietary Mine, showing north set of furnaces, concentrating, and leeching plants.
21. View of line of the Broken Hill lode, looking south, taken from the Broken Hill Proprietary Block 14 Mine.
22. Block 10 Silver Mine, Broken Hill, showing Campbell's Shaft and engine-fitting shop.
23. Block 14 Silver Mine, showing smelting and concentrating plants and underground manager's house, from east side of hill.
24. View of Proprietary Mine, and part of the Town of Broken Hill.

1058. COMMISSIONERS FOR NEW SOUTH WALES, Sydney.

Photographs illustrating the Jenolan and Wellington Caves, etc. Prepared to the order of the Commissioners by Charles Potter, Government Printer.

No. 1. Interior of the Jenolan Caves—"The Show Room."
2. ,, ,, "Nellie's Grotto."
3. ,, ,, "Gem of the West."
4. ,, ,, "The Curtain."
5. ,, ,, "Bat Cave."
6. ,, ,, "Lady Wise's Cave."
7. ,, ,, "The Willows."
8. ,, ,, "Lurline Cave."
9. ,, ,, "Lucas Cave."
10. ,, ,, "Grand Arch."
11. ,, ,, "Nettle Cave."
12. View on Cox's River, near Jenolan Caves.
13. Evan's Crown, near Tarana.
14. The Wellington Caves—Entrance.
15. ,, ,, ,,
16. ,, ,, Interior View—"The Altar."
17. View on the Creek, near Wellington.
18. Kerosene Shale Industry, Joadja Creek.

Department E.—Mines, Mining, and Metallurgy.

Group LXVII—Classes 410 and 411: Illustrations of Mines, &c.

1059. COMMISSIONERS FOR NEW SOUTH WALES, Sydney.

Series of views, illustrating the Yarrangobilly and Wombeyan Caves. Prepared to the order of the Commissioners by Kerry & Co., Sydney.

YARRANGOBILLY CAVES, SNOWY MOUNTAINS.

No. 1. Cathedral Ruins, South Cave.
2. Lot's Wife, South Cave.
3. Entrance to North Cave.
4. Queen's Chamber, North Cave.
5. The Alhambra, Jersey Cave.
6. Shawls, Jersey Cave.
7. Titania's Bower, Jersey Cave.
8. Grotto Cave.
9. The Solitary, Castle Cave.

WOMBEYAN CAVES, NEAR TARALGA.

10. The Wombeyan Arch, entrance to the Old Caves.
11. Centennial Organ, New Cave.
12. Lot's Wife, New Cave.
13. Lot's Wife and the Cockatoo.

INDEX.

NOTE.—*The figures given in each case refer to page of Catalogue.*

A

Abram Coal-mining Co., 63, Pitt-street, Sydney. Coal, 335.
Alum, 236.
Antimony Ores, 232.
Artificial Stone. Flagging, 358.
Asbestos, 235.
Asphaltic Masties and Mixtures, &c., 358.
Auriferous Quartz, 238.
Australian Agricultural Co. Newcastle, Coal, 335.
Australian Alum Co. (Limited), 12, O'Connell-street, Sydney. Alunite, 358.
Australian Kerosene Oil and Mineral Co. (Limited), 5, Gresham-street, Sydney. Kerosene shale, 347, 349.

B

Bensusan, S. L., 12, O'Connell-street, Sydney. Tin Ore, 270.
Bertram, J., Glen Elgin, *via* Glen Innes. Auriferous Pyritous quartz, 238.
Binghi Silver and Lead-mining Co., 134, Pitt-street, Sydney. Silver Ore, 253.
Bishop, L., Muree, Raymond Terraee. Freestone, 352.
Bismuth, 233, 281.
Brazenall, W., junr., Mittagong. Iron Ore, &c., 283.
Breckenridge & Watson, Newcastle. Iron Ore and Limestone, 283.
Breckenridge, James, Wyrallah, Richmond River. Tripolyte, 356.
British Broken Hill Proprietary Silver-mining Co. (Limited), offiees, Abchureh Chambers, Abchurch Yard, London, &c., E.C.; 39, Queen-street, Melbourne, Victoria. Silver-lead Ores, 253.
Broken Hill, Block 14 Silver-mining Co., Broken Hill, (J. Brandon, Secretary), 15, Queen-street, Melbourne. Silver-lead Ores, 254.
Broken Hill Junction Silver-mining Co., offiees, Queen-street, Melbourne. Silver-lead Ores, 254.
Broken Hill Proprietary Silver-mining Co. (Limited), office, 31, Queen-street, Melbourne. Silver-lead Ores, 254; Working summary of mine, 256.
Broken Hill Proprietary Block 10 Silver-mining Co. (Limited), 15, Queen-street, Melbourne. Silver-lead Ores, 254.
Brown, J. & A. Newcastle, Coal, 335.
Browne, T., Ravensfield, near West Maitland. Sandstone, 352.
Building Stones, Granites, Slates, &c., 351.
Building Stones, Marbles, Ornamental Stones, and Quarry Produets, 351.
Burns, J., Bathurst. Marble Monument, 352.
Burwood Coal-mining Co. (Limited), Newcastle. Coal, 337.

C

Caldwell, John T., Union Chambers, 71, Pitt-street, Sydney. Auriferous Quartz, 239.
Carboniferous Fossils, 294.
Carcoar Cobalt Co., Carcoar. Cobalt Ore, 291.
Castle Wellington Tin and Silver-mining Co. (No Liability), H. M. Deakin, Legal Manager, 70, Pitt-street, Sydney. Tin Ore, 270.
Central Broken Hill Silver-mining Co., Offices, Pitt-street, Sydney. Silver-lead Ores, 257.
Chromite, 233.
Clabby, John, Belgravia. Paint Ochres, 358.
Classification, 217.
Clays, Kaolin, &c., 357.
Coal, &c., 332.
Coal Measures (Lower, Middle, and Upper). Fossils from, 296.
Coal—Statistics of Yield, Value, and Reports, 237.
Cobalt, 234.
Collections of Minerals systematieally arranged, 238.
Collections of Ores and the Associated Minerals, Diamonds, and Gems, 238.
Commissioners for New South Wales. Marble in slabs, 352; Photographs of Jenolan and Wellington Limestone Caves, 364; Photographs of the Yarrangobilly and Wombeyan Limestone Caves, 365; Photographie Illustrations of Silver Mines at Broken Hill and Neighbourhood, 363.

Copper and Copper Ores, 230, 277.
Corbett, H. P., Eskbank, Lithgow. Kerosene Shale, 349.
Cretaceous Fossils, 299.
Crown of the Peak Gold-mining Company (no liability), 131, Pitt-street, Sydney. Auriferous Lode Stuff, 239.
Crystallography, 238.
Cullen Bullen Lime and Cement Company (limited), 347 to 353, Sussex-street, Sydney. Cement, &c., 352, 357; Cement Castings, &c., 352, 357.
Cunningar Tribute Gold-mining Company (limited), 16, Norwich Chambers, Hunter-street, Sydney. Auriferous Pyritous Quartz, 239.

D

Deep Creek Gold-mining Company, Nambucca River. Auriferous Arsenical Lodestuff, 239.
Department E, Mines, Mining, and Metallurgy. Classification, 217.
Devonian Fossils. (Marine Series), 294.
Diamonds and other Gems, 292.
Donnelly, D. C. J., M.P., Cowra. Magnetic Iron Ore, 284; Porphyry and Serpentine, 352.

E

E. (Department), Mines, Mining, and Metallurgy. Classification, 217.
Eleanora Gold and Antimony-mining Co. (Geo. Smith, Manager), Hillgrove, near Armidale. Auriferous Quartz, 240.
Engelen, J. B., Sheridan-street, Gundagai. Copper Ore, 277. Chromite, 284.
Eocene Fossils, 299.

F

Fossils, 293.
Franks, W. J., 3, Denison Terrace, Ridge-street, Surry Hills, Sydney. Auriferous lodestuff, 240.

G

Garibaldi Gold-mining Co. (Limited), 19, Post Office Chambers, Pitt-street, Sydney. Auriferous Antimonial Quartz, 240.
Gem Stones, 235.
Genowlan Shale Co. (No Liability), 14, Victoria Chambers, Castlereagh-street, Sydney. Kerosene Shale, 349.
Gibraltar Hill Gold Mining Co., Adelong. Auriferous Pyritous Quartz, 241.
Golden Clad Gold-mining Co. (Limited), Cargo, near Orange, Walter Burrell, Managing Director, 108, Pitt-street, Sydney. Auriferous Pyritous Quartz, 241.
Gold, 224.
Gold Ores from, 238.
Gold specimens, 242.
Gordon Emery and Colour Co., Post Office Chambers, Pitt-street, Sydney, 358.
Graphite and its products, clays, &c., 356.
Graphite (Crude), 356.
Great Cobar Copper-mining Co. (Limited), 131, Pitt-street, Sydney. Copper Ore, 277.
Great Jingera Proprietary Silver-mining Co. (No Liability), 2, O'Connell-street, Sydney. Argentiferous and Auriferous Bismuth, 257.
Great Nuntherungie Proprietary Silver-mining Co., W. H. Hickey, Secretary. Nuntherungie. Silver-lead Ores, 257.
Greta Collieries Co. (Limited), Sydney office, 63, Pitt-street; London office, 6, Crossley Square, E.C. Coal, 338.
Grinding, Abrading and Polishing Substances, 356.

H

Hayes, W. G., The Hermitage, Pieton. Hematite, 284.
Hayton, G., Newbridge. Brown Hematite, 284.
Hetton Coal-mining Co. (Limited), Bond-street, Sydney, 338.
Horton, T., junior, Fairfield, Drake. Collection of Minerals, 302.

I

Illawarra District—Its facilities for Shipment of Coal, 334.
Iron, Manganese, Chromium, and Cobalt, 283.
Iron, 231.
Isaacsohn, Martin, Nundle. Reef and Alluvial Gold Specimens, 307; Silver Ores, 312; Tin Ores, 313; Copper Ores, 314; Antimony Ores, 315; Iron Ores, 315; Gem Stones, &c., 315; Miscellaneous Specimens, 316; Fossils, 317.

K

Kennedy and Bateman, Tenterfield. Polishing Substance, 356.

L

Lark and Sons, Wynyard-street, Sydney. Antimony Ores, 280.
Lead, 232.
Leoni, Keating, and party, Bimbimbi Creek, Mogo District. Auriferous Quartz, 241.
Lewis, Mortimer W., Architect, East Maitland. Building Stones, 353; Marbles and Limestone, 353.
Limestone, Cements, and Artificial Stone, 358.
Liversidge, Archibald, M.A., Professor of Chemistry, Sydney University. Crystallised and other Gold Specimens, 318; Moss Gold, Moss Silver, and Moss Copper Specimens, 319; Cut Specimens of Gems and Precious Stones from New South Wales, 320; Diamonds (uncut), 320; Specimens from the Bingera Diamond Deposits, New England District, 320; Specimens from Bengonaway Diamond Mines, near Inverell, 321; Specimens from Du-Toits Pan Diamond Deposits, Cape Diggings, South Africa, for comparison with those found in New South Wales, 321; Gems and Associated Minerals from the Wingecarribee River, Berrima, 322; Gems and Associated Minerals from Uralla, New England District, 322; Specimens from Old Gold-workings, near Mittagong, 323; Gems and other Minerals, chiefly from the New England District, 323; Specimens from Sunny Corner Silver-mine, Mitchell's Creek, 326; Specimens of "Jet" Kerosene Shale from Joadja Creek, 326; Meteorites, 326; Metalliferous Minerals, 326; Mineral Specimens from New Caledonia, 329; Diagrams and Illustrations 361; Scientific Papers, 361; Reports, 361; Papers in Scientific Journals, 361; Models to show the Axes of Crystals, 362; Combination Laboratory Lamp, Retort, and Filter Stand, 363.

M

Mackenzie Brothers, White Cliffs, *via* Wilcannia Opals, 292.
Major's Creek Gold-mining Co., Norwich Chambers, Hunter-street, Sydney, Auriferous Pyritous Quartz, 241.
Manganese, 233.
Marbles, 351.
Marsupials (Pleistocene Fossils), 300.
Mercury, 281.
Mesozöic Fossils, 298.
Miller, D. S. K., 113, Glenmore Road, Paddington, Sydney. Silver Ores, 257.
Mineral Combustibles, Coal, Coke, Petroleum, Natural Gas, &c, 332.
Mineral Products, article by Mr. J. E. Carne, F.G.S., reprinted from "Year Book of New South Wales," 222.
Minerals, Ores, Native Metals, Gems, and Crystals, Geological Specimens, 238.
Mines, Mining and Metallurgy (Department E), 215; Classification, 217.
Minister for Mines and Agriculture, Sydney, Samples of Alluvial Gold, 242; Alluvial and Reef Gold (Nuggets), 243; Auriferous Veinstones and Lodestuffs, 243; collection of Block Specimens, Gold-bearing, 243; collection of Silver Ores 258; Collection of Block specimens of Silver Ores, 263; Iron Ore and Limestone used as flux at the Broken Hill Silver-lead Smelting Works, 264; Rock specimens, illustration of the Stratigraphy of the Barrier Range Silverfield, 265; Collection of Tin Ores, 270; Collection of Block specimens of Tin Ores, 274; Lode and Alluvial Tin Ores, 274; Collection of Copper Ores, 277, 279; Collection of Antimony Ores, 280; Collection of Bismuth Tungsten, and Mercury Ores, and Platinum Sand, 282; Collection of Iron, Manganese, and Cobalt Ores, 285; Diamonds and other Gems, 292; Collection of Characteristic Fossils from the principal sedimentary formations of New South Wales, 293; Upper Silurian Fossils, 293; Devonian Fossils (Marine Series), 294; Carboniferous Fossils, 294; Permo-Carboniferous Fossils, 295; Fossils of the Lower and Middle Coal Measures, 296; Fossils of the Upper Coal Measures, 297; Mesozöic Fossils, 298; Cretaceous Fossils, 299; Eocene Fossils, 299; Pliocene Fossils, 299; Pleistocene Fossils, 300; Marsupials, 300; Collection of Samples of Coal from the Coal Seams of New South Wales, 339; Diamond Drill Cores, 346; full section from Petroleum Oil Cannel Coal Seam, &c., 349; Collection of Marbles, Serpentines, &c., 353; Collection of Samples of Sydney Sandstone, 354; Collection of Building Stones, 355; Crude Graphite, 357; Asbestos, 357; Geological Maps and Publications, 359.
Mining Committee, Members of, 216.
Mitchell's Creek Freehold Gold Estate, Cape's Chambers, Bond-street, Sydney (Davies, Dalveen, Dick, and Findlay, owners). Auriferous Pyritous Quartz, 251.
Molybdenum, 281.
Mount Gahan Gold-mining Co. (No Liability), Pambula. Auriferous Pyritous Lodestuff, 251.
Mount Kembla Coal-mining Co., 97, Pitt-street, 341.
Mount Stewart Lead and Silver-mining Co. (No Liability), Leadville; Office, 15, Hunter-street, Sydney. Silver-Lead Ores, 268.
Mudgee Pioneer Shearstone, Oil, and Whetstone Co., 12, Post Office Chambers, Pitt-street, Sydney. Oilstones, 355.

N

Newcastle Coal-mining Co. Newcastle. Coal, 341.
Newcastle Harbour and its facilities for shipment of coal, 334.
Newcastle-Wallsend Coal Co., South British Chambers, 12, Bridge-street, Sydney. Coal, 342.
New South Wales Shale and Oil Co. (Limited), W. Hall, Manager, 162, Clarence-street, Sydney. Kerosene Shale, 350.
Nickel, 234.
Nil Desperandum Silver-mining Co., W. H. Hickey, Secretary, Nuntherungie. Silver-lead Ores, 268.
Nuggets (Gold), 243.

O

Ochres, 358.
O'Neill, Charles, M. Inst., C.E., 200, Cumberland-street, Sydney. Artificial Flagging, 358.
Opals, 292.
Osborne, Wallsend Coal-mining Co., F. B. M'Cabe, Manager, Change Alley, Circular Quay, Sydney. Coal, 342.

P

Patent Asphaltum Co. of New South Wales (Limited), 244, Pitt-street, Sydney. Asphalt Blocks, &c., 358.
Peak Hill Proprietary Gold-mining Co. (No liability), Peak Hill, near Dubbo; office, Victoria Chambers, Castlereagh-street, Sydney. Auriferous Lodestuff, 252.
Permo-Carboniferous Fossils, 295.
Petroleum Oil Cannel Coal, (Kerosene Shale), 333.
Pigments, Iron Oxides, Ochres, Vermilion, &c., 358.
Pinnacle Amalgamated Silver-mining Co. (Limited), 70, Queen-street, Melbourne. Silver Ore, 268.
Platinum, 233. 281.
Pleistocene Fossils, 300.
Pliocene Fossils, 299.
Pritchard, W., Picton. Freestone, 355.

Q

Quartz, Auriferous, 238.

R

Rothery, W. M., Cliefden, near Lyndhurst. Brown iron ore, 290.

S

Saunders, R., Amy-street, Pyrmont, Sydney. Building stones, 355.
Saywell, T., 6, Park-street, Sydney. Coal, 343.
Silurian (Upper) Fossils, 293.
Silver and lead ores, 227, 253.
Silver ores. From 253.
Sinclair, G. H., 66, King-street, Sydney. Silver-lead and copper ores, 269.
Smith, C. W., Rocky Point Road, Carroll's Hill, Kogarah. Plastic Clay, 357.
South Bulli Coal Mining Co., 78, Pitt-street. Sydney Coal, 343.
Spiers and Rigg, 70, Queen-street, Sydney. Tin ore and gem stones, 276.
Statham, H. W., Sydney. Iron ore, 291.
Sulphates, Alums and other salts, 358.

T

Tin and Tin ores, 231, 270.
Tungsten, 234.

W

Wallah Wallah Silver-mining Syndicate, near Yass. Silver-lead ores, 269.
Wallarah Coal Co. (Limited), Catherine Hill Bay. Coal, 344.
West Wallsend Coal-mining Co. (Limited), 7, Exchange, Sydney. Coal, 344.
White Rock Proprietary Silver-mining Co., Drake. Silver ore, 269.
Wickham and Bullock Island Coal-mining Co., Exchange, Sydney. Coal, 346.
Wolfram, 281.

Z

Zinc, 233, 281.